



SERIES

SCIENCE

The Main Book

By A Group of Supervisors

Interactive E-learning
Application



5th
Primary
2023
FIRST TERM

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Theme One : Systems

UNIT

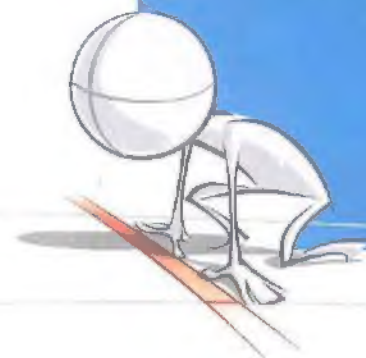
1

Interactions of Organisms



Get Started

What I Already Know



- Plants are found everywhere around us.
- There are some basic needs that plants depend on to grow up and survive such as :

- Air. - Water. - Sunlight.

- The opposite picture shows two potted plants :

Plant (A) has green leaves and grows well, while plant (B) is wilted and has yellow leaves.



Plant (A)



Plant (B)

- Plant (B) cannot grow well and die due to one or all the following reasons :
 - It may be placed in a dark place, so it doesn't get sunlight.
 - It may not be watered regularly.
 - It may be placed in a bad aerated area, so it doesn't get enough fresh and clean air.
- In this unit, you are going to study :
 - How plants use sunlight, air and water to make their own food.
 - Types of living organisms : producers, consumers and decomposers.
 - The interaction between living organisms to get their needed energy through what is called "Food Chains" and "Food Web".
 - What happens to an ecosystem, if a food chain in this ecosystem is interrupted.



- Unit Project : "Build a Miniature Ecosystem"

At the end of this unit, you are going to build a miniature ecosystem (small ecosystem) to show how living organisms depend on other living organisms to get their food. Also, the importance of some non-living things such as air, water, soil ... etc. for the survival in an ecosystem.

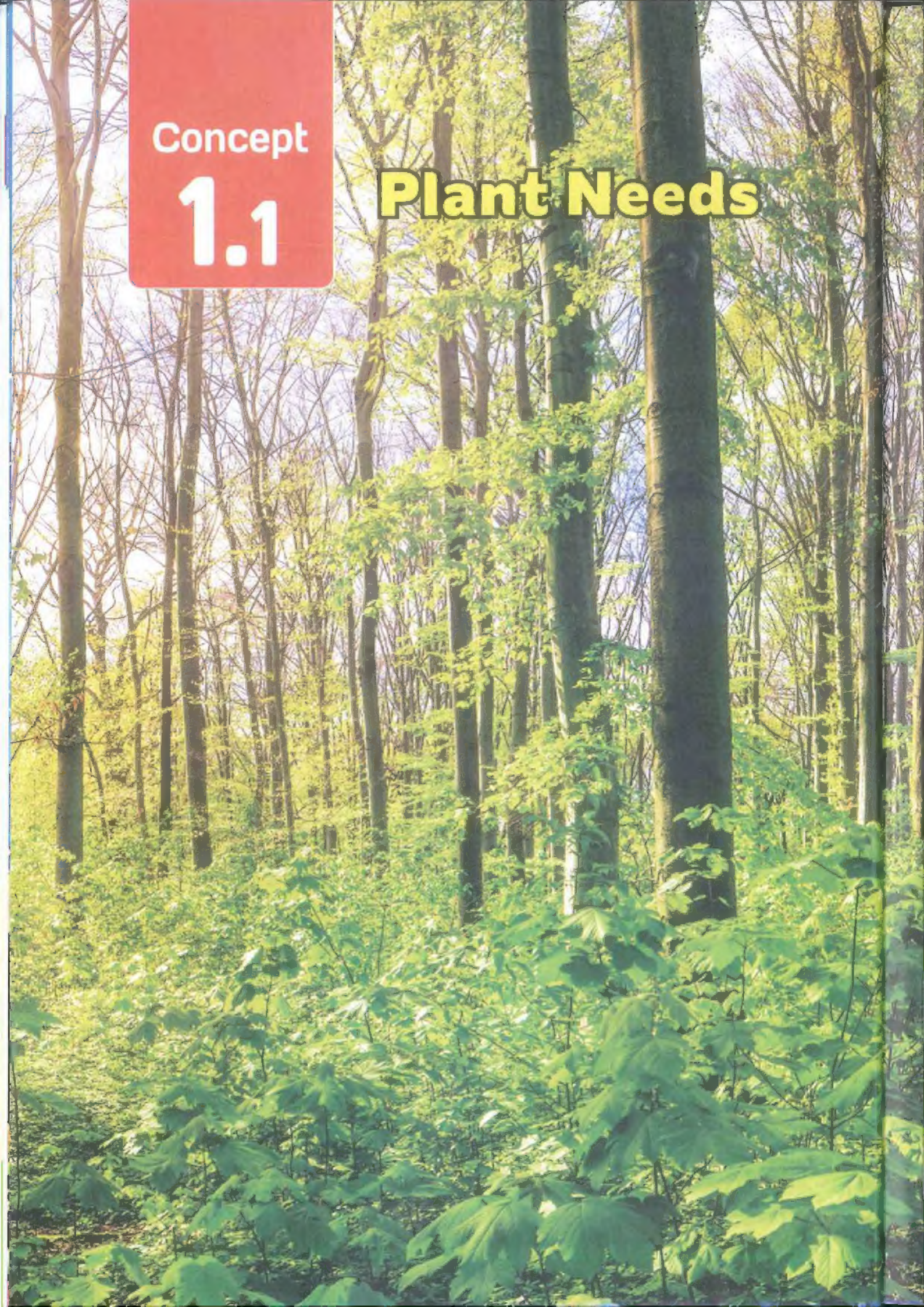


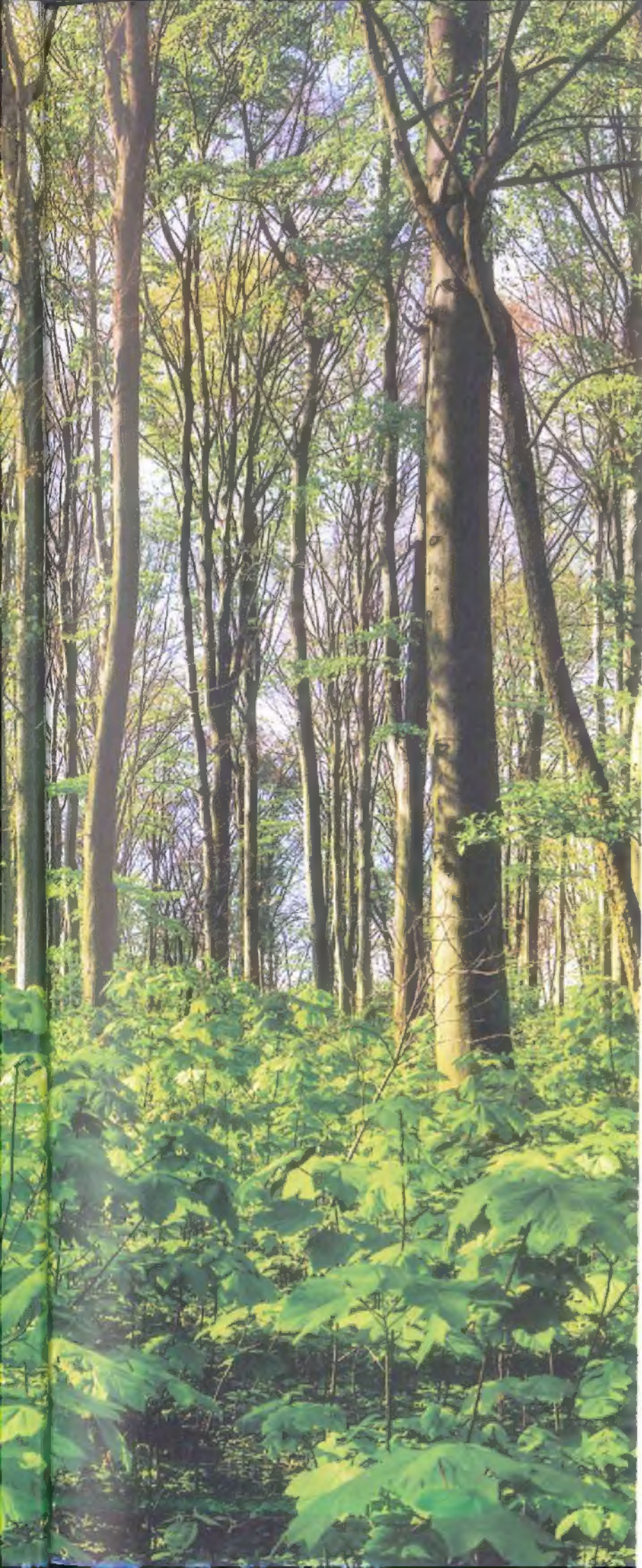
Ecosystem

Concept

1.1

Plant Needs





Learning outcomes

By the end of this concept, your child will be able to :

- Use evidence to argue that plants use specialized structures to obtain the materials that they need to grow from Sun, air and water.
- Develop a model of how energy moves through plants.
- Develop a model of plant processes that use natural resources to complete life processes.
- Compare the structure and function of the transport system in plants with the circulatory systems in humans.

Key vocabulary

- Arteries
- Photosynthesis
- Circulatory system
- Plant
- Digestive system
- Stem
- Stomata
- Survive
- System
- Phloem
- Vessels
- Xylem
- Dispersal
- Germinate
- Glucose
- Nutrients
- Veins

Notes For Parents On Concept [1.1]

Lessons	Activities	What you should do with your child
1	Activity 1	Explain to your child how the structures of a plant use water, air and light to perform life processes.
	Activity 2	Discuss with your child what the plant needs to grow and survive.
	Activity 3	Digital extension activity.
	Activity 4	Digital extension activity.
	Activity 5	Discuss with your child basic and not basic plant needs for photosynthesis.
2	Activity 6	Help your child germinate some seeds in a wet paper towel then compare their growth to the growth of the other seeds which are placed in soil.
3	Activity 7	Help your child do an experiment to show the effect of light on plant growth.
	Activity 8	Discuss with your child some plant structures.
4	Activity 9	Discuss with your child the different plant parts that take up and transport water, nutrients and air to make the plant food.
	Activity 10	Help your child do an experiment to observe how water and nutrients move from the roots to the leaves of a plant.
5	Activity 11	Let your child think about the similarities and differences between the plant transport system and the human circulatory system.
	Activity 12	Digital extension activity.
	Activity 13	Discuss with your child how plants make their own food.
	Activity 14	Digital extension activity.
	Activity 15	Discuss with your child the function of flowers of plants.
6	Activity 16	Help your child to think about ways of seed dispersal in nature.
	Activity 17	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 18	Digital extension activity.
	Activity 19	Let your child review the main points in this concept.

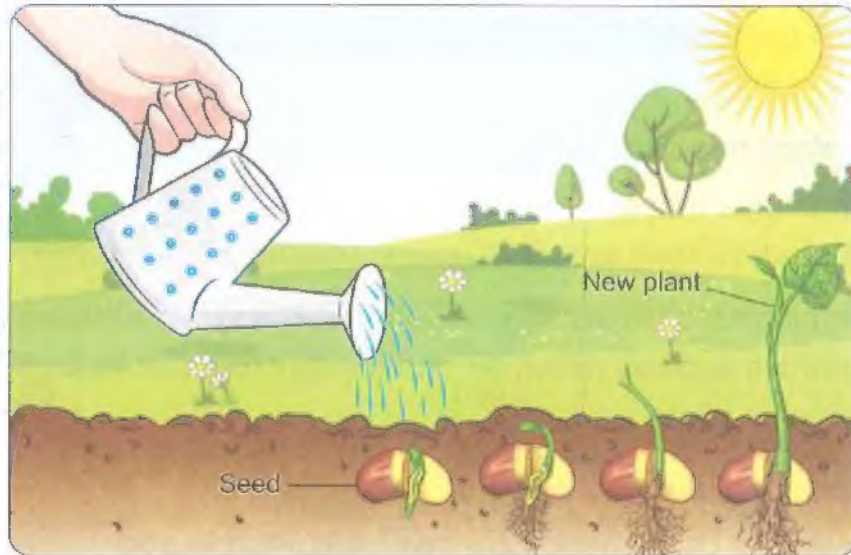
LESSON

1

Activity

1

Can You Explain ?



- When you observe the figure above that shows the steps of growing up of a bean seed to form a new plant, you can find out what the plant needs to grow.
- Plants need water, air, sunlight and space to grow.
- **How do the structures of a plant use water, air and light to perform life processes ?**
 - Plants have roots, stem, leaves and sometimes flowers or fruit.
 - Plants use these specialized structures to obtain their basic needs of water, air and light.
 - Each part of a plant has its own function, where the roots help the plant get water and nutrients from the soil and the other parts of the plant help it survive.
- **In this concept, we will study :**
 - Plant basic needs.
 - Plant structure.
 - Parts of a plant.
 - Comparing plant and human systems.
 - Transport system of plants.
 - Plant food.
 - Flowers and seeds.
 - Seed dispersal.

bean seed
space
perform
nutrients

بذرة فول
مساحة
يقوم
العناصر الغذائية

specialized
obtain
basic needs

مخصص
يحصل على
احتياجات أساسية

soil
transport system
dispersal

التربة
نظام النقل
نثر / انتشار

Activity 2 Tree Needs

► Look at the opposite picture, then put (✓) or (x) :

Both human and plant need food and water everyday to survive.

()



► What does a plant need to survive ?

- Plants use structures that are unique among living organisms to produce their own food using sunlight.
- When a tree is planted, it begins to grow from a seedling into a mature tree depending on some resources such as water, air and sunlight to make its food to survive.



Check your understanding

► Circle the items that the plant needs to grow and survive :



Space



Water



Fruits



Meat



Sunlight



Air



Vegetables



Digital Extension Activity

Activity 3 " Growing " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.



Digital Extension Activity

Activity 4 " Water in the Desert " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

human
unique
seedling

الإنسان
فريد
شجرة
living organisms
plant

الكائنات الحية
نوع

mature
resources

ناضج / كبير
مصادر

Activity 5 What Do You Already Know About Plant Needs ?

Plants and Animals

- Plants need water, air, sunlight and nutrients from soil as basic needs to live and grow.
- Water and air are basic needs of plants, animals and humans.
- Humans and other animals need to eat food to gain energy and nutrients to live and grow.
- Most plants get nutrients from soil and make their own food through a process known as "photosynthesis" that takes place in the plant leaves.

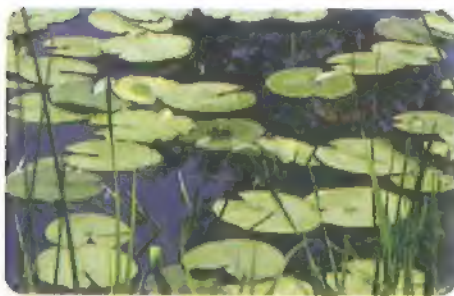
Plant Needs

- Plants need some resources to live and grow such as :

- Nutrients.
- Water.
- Carbon dioxide gas (a gas found in the air).
- Sunlight.

- Soil may not have been included as a basic plant need because :

Some plants only grow in the water.

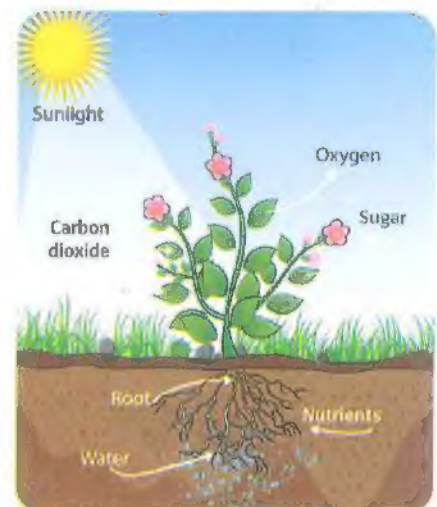


Some plants grow on other plants instead of having roots in the soil.



Plants and Food

- Plants make their own food which is a type of sugar that provides the plant with energy to grow.
- Plants make their food (sugar) in their leaves by means of photosynthesis process, where :
 - The roots of a plant absorb water and nutrients from the soil.
 - Water and nutrients are carried from the roots to the leaves through the stem.



gain
energy
by means of

يكسب
الطاقة
عن طريق

photosynthesis
carbon dioxide gas
absorb

البناء الضوئي
غاز ثاني أكسيد الكربون
يمتص

instead of
provide

بدلاً من
يمد



Check your understanding

Classify the following items into those (needed) or not needed for photosynthesis

or "Not basic plant need for photosynthesis" :

(Water - Sunlight - Oxygen - Sugar - A forest - Carbon dioxide)

Basic plant need for photosynthesis	Not basic plant need for photosynthesis
.....
.....
.....
.....

Try to answer

Self Assessment (1)

Exercises on Lesson 1

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. All the following are plant basic needs to make its own food, except
a. water. b. air. c. sunlight. d. rocks.
2. The of plant get water and nutrients from the soil.
a. roots b. stems c. leaves d. flowers
3. Humans and other animals need to eat to get
a. oxygen gas. b. energy.
c. carbon dioxide gas. d. soil.
4. Plants make their food by a process known as
a. respiration. b. absorption.
c. photosynthesis. d. digestion.
5. and are from the plant needs that help it make photosynthesis.
a. Oxygen – water b. Sunlight – carbon dioxide
c. Water – earth worms d. Nutrients – oxygen
6. Plants and humans are similar in some of their basic needs to survive such as
a. sunlight and rocks. b. water and air.
c. carbon dioxide and soil. d. soil and water.
7. Plants take from the air to make its food.
a. water b. oxygen gas
c. carbon dioxide gas d. sugar
8. Which of the following sentences is wrong ?
a. Plants need sunlight to grow.
b. Plant roots absorb water from the soil.
c. Plants make their own food by respiration process.
d. Plants make their own food in their leaves.
9. Water and nutrients are carried from the roots to the leaves through the
a. stem. b. soil. c. fruits. d. flowers.
10. In photosynthesis process, plant produces to get energy.
a. oxygen gas b. sugar
c. carbon dioxide d. water

2 Put (✓) or (X) :

1. Plants need water and air only to grow. ()
2. All plants have roots, stems and leaves. ()
3. Each part of the plant has its own function. ()
4. Stem of the plant absorbs water from the soil. ()
5. Human, animals and plants need food and water to survive. ()
6. Plants use the energy of the sunlight to make their own food. ()
7. Carbon dioxide gas is one of the plant needs that helps it to grow and survive. ()
8. Photosynthesis process takes place in the plant roots. ()
9. The plant can make its own food in the absence of water. ()
10. Plants have unique structures that help them make their own food using sunlight. ()

Complete the following sentences :

1. Different plants have three main common structures which are stem, and
2. Plants absorb and from the soil through their
3. Plants make their own food through process that takes place in their
4. The stem carries water and nutrients from to of the plant.
5. The plants use the light of to make their own food.
6. The food of plant is a type of which is made in their by photosynthesis process.
7. Soil is the source of and nutrients which the plant need to make its own food.
8. Some plants may not depend on as they grow in the water.

Write the scientific term of each of the following :

1. A gas taken from the air by leaves to help the plant to make its own food. (.....)
2. A liquid substance that plants, animals and human need to survive. (.....)
3. A part of the plant that carries water and nutrients from the roots to the leaves. (.....)
4. The process by which plant can make its own food. (.....)
5. The gas which is released from plants during photosynthesis. (.....)
6. The source of energy that the plant use to make photosynthesis. (.....)

Cross out the odd word :

1. Carbon dioxide gas – Water – Oxygen gas – Sunlight. (.....)
2. Roots – Stems – Leaves – Sunlight. (.....)

Give reasons for :

1. Roots have important role in photosynthesis process of plants.

.....

2. Photosynthesis process is important for plants to survive.

.....

3. Some plants don't need soil as a basic need.

.....

What happens if ... ?

1. Plants have no stems.

.....

2. Plants can't get carbon dioxide gas from air.

.....

3. We put a green plant in a dark room for many days.

.....

Choose from column (B) what suits it in column (A) :


(A)	(B)
1. Sunlight	a. is absorbed by the roots of the plant.
2. Soil	b. is necessary for plant's growth.
3. Water	c. is not a basic need for plant growth.
4. Oxygen	d. a gas which is produced during photosynthesis process.
	e. a gas which is the plant uses during photosynthesis process.

1.

2.

3.

4.

 Adam plants a flowering plant in a pot, He put this plant in a soil rich in nutrients and water it everyday, he used to cover this pot everyday with a carton box to hide it from his brother, after many days, do you think that this plant will survive ? And why ?

- a. Yes, because it has nutrients and water.
- b. No, because it needs air and light.
- c. No, because plant doesn't need water and soil.
- d. Yes, because it can survive without sunlight.



LESSON 2

Activity

6

Do Plants Need Soil?

► Look at the opposite picture, then put (✓) or (✗).

1. Plants need water, air and sunlight to grow. ()
2. Soil is not a basic need for plants to grow. ()



Now, we will germinate some seeds in a wet paper towel, measure their growth and then compare their growth to the growth of the other seeds which are placed in soil.

Note

Germinating means that the plant sprouts and begins to grow from a seed.

Tools



Plastic cup contains
potting soil



Paper towels



Six bean seeds
(Fava beans)



Plastic plate



Water



Metric ruler

Steps

1. Use the water to wet the paper towel.



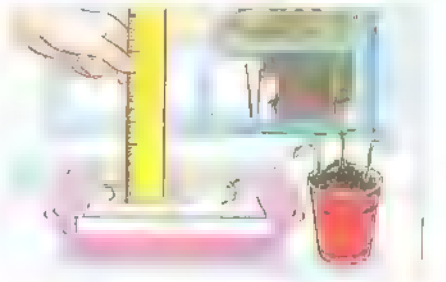
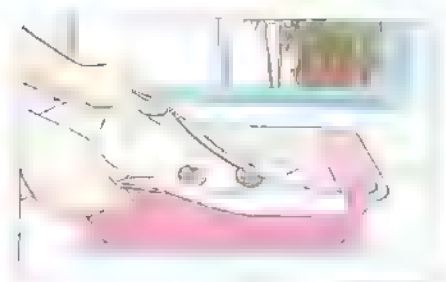
germinating
wet
paper towel

إنبات
مبلل
مشفقة ورقية
measure
growth
sprout

بقيس
نمو
بنسب
fava beans
metric ruler
potting soil

القول
عص صرية
ب اراعنه

2. Place three seeds in the top half of the paper towel and fold the bottom half of the towel up so that it covers the seeds then, place the paper towel inside the plastic plate.
3. Plant the other three seeds in the cup that contains potting soil then, water the seeds.
4. Place the plate and the cup in a place where they can get sunlight.
5. Check the growth of seeds over the next several days. Wet the paper towel and water the soil as needed.
6. Measure the growth of each seed using the metric ruler.



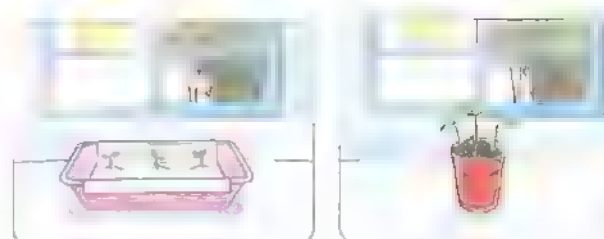
► Observations

- The initial growth of the seeds placed in the paper towel is similar to that of the seeds planted in the soil.



After 7 days

- The seeds grown without soil would not grow as quickly as the seeds in the soil.



After 14 days

Conclusions

1. The seeds can grow without soil if they have water and Sun.
2. Plants can grow without soil for a while, but finally they need soil.

Notes

1. Plants can grow in a hydroponic system instead of soil.
2. Hydroponic system means a place full of water that contains the important minerals for the plant to grow.



Hydroponic system



Check your understanding

► Put (✓) or (x) :

1. The presence of soil is necessary for seeds in their initial growth. ()
2. When bean seeds grown in a wet paper towel, they need soil after a while. ()

In the Assessment Book :

Try to answer

Self-Assessment (2)

Exercises on Lesson 2

● Understand

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● Analyze

● Evaluate

● Create

 Choose the correct answer :

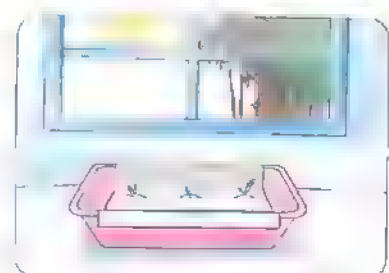
1. When the plant seed begins to grow and makes sprouts this process is called ...
a. respiration. b. germination. c. absorption. d. reproduction.
2. Hydroponic system should be full of ... and ... to help the plant grow.
a. water – oil b. sunlight – water
c. sand – water d. water – minerals
3. If we put some bean seeds in a facing the sunlight, it may germinate.
a. dry paper towel b. wet paper towel
c. plastic plate d. metric ruler
4. In the presence of Sun and water, the seeds can germinate at the beginning of growth without the need of
a. soil. b. rocks. c. insects. d. dry paper towel.

Put (✓) or (X) :

1. At the beginning of germinating some bean seeds, they can grow without soil or sunlight. ()
2. If we put the plant's seeds in a place containing minerals and water, it will grow. ()
3. All seeds need soil in its initial growth. ()
4. The seeds that are put in a soil full of water and minerals can grow slower than the seeds that are put in a wet paper towel. ()
5. After many days, the growth of plant's seeds in a pot containing soil is similar to the growth of plant's seeds in a wet paper towel. ()

Look at the opposite figure, then choose the correct answer :

- a. This process is called
(germination photosynthesis – respiration)
- b. Seeds of plant will need to complete
its growth after many days.
(soil – water – insects)



4 What happens if ...?

1. We put a seed of bean in a soil.

.....

2. We put a bean seed in a wet paper towel for more than two months.

.....

Look at the following figures then, complete the following sentences using the words below :

(soil – figure (A) – figure (B))



Figure A

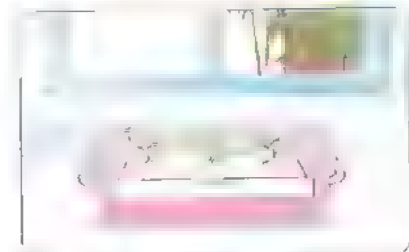


Figure B

1. The seeds in grow faster than those in
2. Seeds in figure (B) should be transferred into ... to complete its growth.

Activity 7 Sunlight : A Basic Need

Look at the opposite pictures, then answer the question :

Does plant (B) grow as plant (A) ? Why ?



Plant (A)



Plant (B)

- Plants make their own food through the photosynthesis process.

Photosynthesis process :

It is the process through which plants use the energy in sunlight to make their own food.

- Green plants use their leaves to collect sunlight and carbon dioxide from the air.
- Inside the green plant, sunlight allows carbon dioxide to combine with water to make sugar, which gives the plant the energy it needs to grow.

Now, we will do an experiment to show the effect of light on plant growth.

Tools



Two plastic cups



Two bean seeds



Potting soil



Water

Steps

- Add soil to the two cups, place the bean seeds on the soil, one per cup and cover the seeds with about 2 centimeters of soil.



2. Add the same amount of water to each cup to moisten the soil.



3. Place the red cup where it will receive light and place the blue cup in the dark.



4. Water both plants regularly and observe them along two weeks.



► Observations

After two weeks, we observe that :

- The plant in the red cup grew taller than the plant in the blue cup.
- The plant in the red cup has four leaves with dark green color, while the plant in the blue cup has two small leaves with pale green color.



► Conclusions

- Light is a basic need for the plants, like water, air and nutrients.
- Light is important to plant growth because plants use light to make their own food, so the plant without light does not grow well because it had less food.



Check your understanding

► Put (✓) or (x) :

1. In the absence of light, plants can make their own food.

()

2. When a plant grew in light, its leaves become pale green.

()

Activity 8 Plant Structure

In this activity, we will learn about plant parts and how the different plant structures help the plant survive.

Basic needs

All living organisms have basic needs that they must meet to survive.

For example :

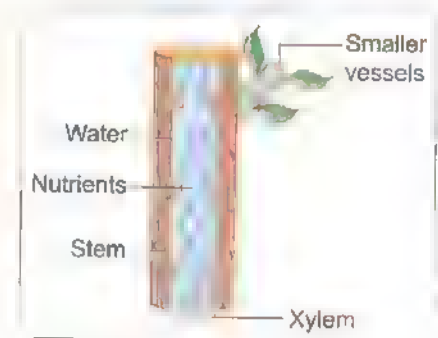
- Humans need water, air and food to live, while all plants need water and air to survive.
- Plants and humans are very different because plants use sunlight to make their own food from air and water, but humans get their food from plants and animals.

Plant structure

Plant's roots absorb water and nutrients from the soil and carry them to the rest of the plant.



- Water and nutrients move up the plant's stem through tubes or vessels called **xylem**.
- Smaller vessels of xylem connect the stem to the leaves.



Note

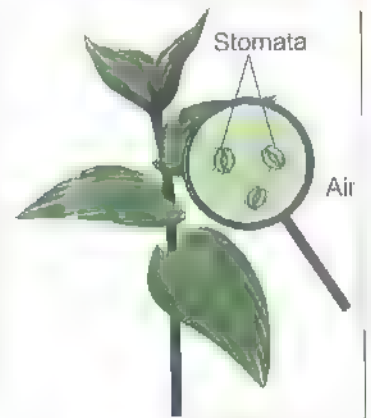
Plant's leaves get their needs of water and nutrients from the soil with the help of :

- Plant's roots.
- Xylem in the plant's stem.
- Smaller vessels of xylem connect the stem to the leaves.

- Leaves collect sunlight.
- Also, the air that plant need moves into the leaves through tiny openings called **stomata**.

Stomata :

They are pores on the surface of plant's leaves that allow gases to move into and out of the plant.



Check your understanding

► Complete the following sentences using the words below

(xylem – Plants – stomata Humans – Roots)

1. _____ get their food from plants and animals.
2. _____ absorb water from the soil and carry it to the other parts of the plant.
3. _____ use sunlight to make their own food.
4. Water and nutrients move up the plant's stem through vessels known as ...
5. The plant's leaves have tiny openings called _____

In the Assessment Book :

Try to answer :

Self-Assessment ③

Exercises on Lesson 3

● Understand

● Apply

● Analyze

● Evaluate

● Create



Choose the correct answer :

1. Sunlight and carbon dioxide gas are collected by plant's to make its own food.
a. roots b. stems c. leaves d. flowers
2. The plant produces through photosynthesis process that gives it the needed energy to grow.
a. oxygen gas b. water
c. carbon dioxide gas d. sugar
3. The roots of a plant absorb from the soil to help it grow.
a. oxygen gas b. carbon dioxide gas
c. sugar d. water
4. Without the plants can't grow well.
a. insects b. rocks c. sunlight d. moonlight
5. The tubes that are responsible for moving water and nutrients up the plant's stem are called
a. roots. b. xylem. c. leaves. d. flowers.
6. Stomata are present on plant's to allow air to pass through it.
a. roots b. stems c. leaves d. flowers
7. can make their own food.
a. Plants only b. Animals only
c. Humans only d. Plants and some animals
8. All of the following materials can reach the plant's leaves, except
a. nutrients. b. carbon dioxide gas.
c. water. d. soil.
9. help the plant's leaves to get water and nutrients from the soil.
a. Roots only b. Xylem only
c. Roots and xylem d. Xylem and stomata
- 10. All the following parts are important for plants to make photosynthesis process except
a. roots. b. leaves.
c. stems. d. flowers.

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Roots	a. allow gases to come in and out the plant.
2. Stems	b. collect sunlight and carbon dioxide gas which combines with water to help the plant to make its own food.
3. Leaves	c. tubes or vessels that move water and nutrients up the plant's stem.
4. Xylem	d. absorb water and nutrients from the soil.
5. Stomata	e. transport nutrients and water from the roots to all parts of the plant.
	f. absorb oxygen gas from the soil.

1.

2.

3.

4.

5.

Put (✓) or (X) :

1. Green plants can grow in a dark room. ()
2. Roots of plants collect sunlight and carbon dioxide gas from air. ()
3. Xylem is important for plants to transfer water from plant's roots to leaves. ()
4. Water and carbon dioxide are absorbed by plant's root to help the plant to grow. ()
5. When the plant makes photosynthesis process, its leaves become weak and yellow. ()
6. Plants and humans are similar in the way of getting food. ()
7. During photosynthesis process, plant absorbs carbon dioxide gas from air through stomata. ()
8. Light is important for plant growth. ()
9. There are tiny holes opening on the surface of stem that allow gases to pass into the plant. ()
10. Water and nutrients reach the plant's leaves with the help of roots only. ()
11. Plants and humans need water and air to live. ()

Write the specific term of each of the following :

1. The process by which plants make their own food by using the energy of sunlight. (.....)
2. Parts of the plant where sunlight allows carbon dioxide to combine with water during photosynthesis process. (.....)

3. Vessels in plant through which water and nutrients move up from roots to leaves. (.....)
4. Narrow holes spread on the surface of plant's leaves that allow gases to come in and out the plant. (.. ..)
5. The gas that the plant needs to make photosynthesis process. (... ..)
6. A substance that is produced from the plant during photosynthesis process and provides it with its needed energy. (.. ..)

Correct the underlined words :

1. Respiration process helps the plant to make its own food. (.....)
2. Oxygen gas is absorbed by plant's leaves to make photosynthesis process. (.....)
3. When a plant is placed in sunlight, its leaves become pale green. (.. ..)
4. Humans can get their food from air and animals. (.....)
5. Plant's leaves absorb water and nutrients from the soil. (.....)
6. There are smaller vessels that connect the root to the leaves. (.. ..)
7. There are tiny holes on the stem to allow gases passes into the plant. (.. ..)
8. Stomata allow water to move into and out of the plant. (.....)

Complete the following sentences :

1. In photosynthesis process, green plant gets from air to make its own food and produces gas that help us to breathe.
2. Inside the green plant, sunlight allows carbon dioxide to combine with that is absorbed from the soil by plant's
3. The sugar that is produced from photosynthesis process provides the plant with it needs to grow.
4. There are vessels called in the plant that transport water and nutrients to other parts of plant.
5. There are tiny holes in the plant's leaves called that allow gases to move in or out the plant.
6. The presence of and air is very important for plants to grow.
7. Without in the leaves of plants, gases can't move in or out of the plant.
8. There are smaller vessels that transfer and nutrients from the plant's stem to

Give reasons for :

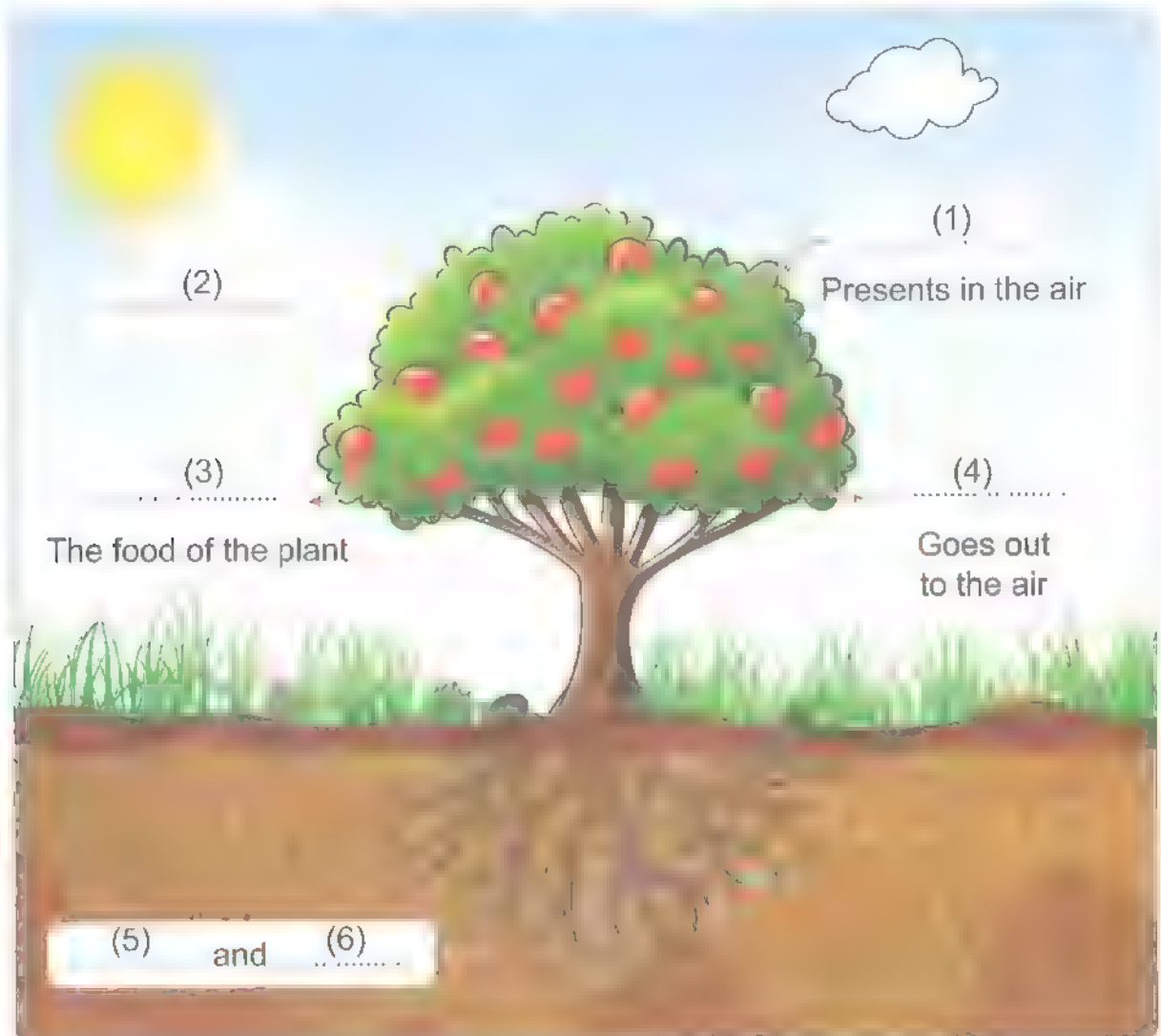
1. The presence of stomata on the surface of plant's leaves.
.....
2. Green plants can make their own food.
.....
3. Xylem vessels are important for the plant.
.....

What happens if ...?

1. Stomata of a plant get closed for long time.
.....
2. A plant is placed in a dark place for many days.
.....

Label the following figure using the words below

(Sunlight – Water – Minerals – Carbon dioxide gas – Oxygen gas – Sugar)



► Look at the opposite picture, then put (✓) or (✗)

1. The main parts of plants are roots, stem, leaves and soil. ()
2. Parts of a plant work together to make food for the plant. ()
3. Although all plants look different, they have similar parts. ()



Now, we will study the different plant parts that take up and transport water, nutrients and air to make the plant food.

• Functions of the plant roots :

- Roots fix (anchor) the plant in the soil.
- Roots absorb (draw) water and nutrients from the soil, which are needed to make food of plants.
- Plant roots have hairlike features called **root hairs** that increase the amount of absorbed water and nutrients that the plant needs.



• Functions of the plant stem :

- Stem transports water and nutrients to the rest of the plant through xylem.
- Stem supports leaves and flowers of the plant.

• There are many forms of stems :

- Some plants have a **wood stem**, such as tree trunks and shrubs.



main
wood stem
trunk
shrubs

رئيسي
ساق خشبية
جذع
شجيرات
transport
anchor
absorb
draw

ينقل
تنسج
يمتص
يسحب
features
root hairs
increase
support

بروزات
لشعيرات الخشبيه
جذع
يدعم

- Most flowers have **upright stems**.



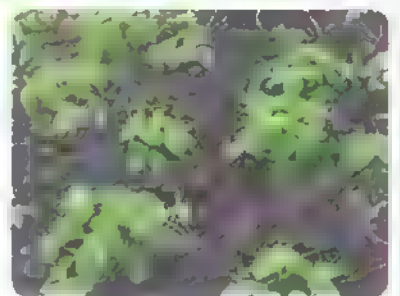
- Some plants have a **climb stem**, such as vines (grapes).



- Some stems extend underground and they are called **tubers**, such as potato plant.



- Some stems extend above and along the ground and they are called **runners**.



• **Function of the plant leaves :**

Leaves make food for the plant through photosynthesis process.

- Leaves need water, carbon dioxide gas and sunlight to make food.
- Leaves contain **chlorophyll**, which gives them their green color.
- Chlorophyll captures energy from the sunlight.

Note

Xylem carry water from the roots to the stem, then to the leaves through smaller xylem tubes.

upright stem
climb stem
vines / grapes

ساق رأسية
ساق متسلقة
نبات العنب

extend
underground
tubers

يمتد
تحت الأرض
الدرنات

runners
capture

امتداد / اجارية
يلقط

- There are two kinds of leaves :

Narrow leaves that look like needles, such as pine trees.



Flat, wide leaves.



Photosynthesis process

- Photosynthesis is a process that takes place inside the leaves.
- During photosynthesis, green leaves use the light energy from the Sun to combine the carbon dioxide from the air with water to produce :
 - **Nutrients** (such as sugars, starches, fats and proteins) that the plant needs to live.
 - **Oxygen gas** that animals and people need to breathe.
- As the photosynthesis process is completed inside the leaves, there are tubes called **phloem** that transport the food materials downward, from the leaves to the other parts of the plant.

? **Give a reason for :**

The life on Earth without plants would be impossible.

Because during photosynthesis process plants produce oxygen gas that animals and people need to breathe.



Choose from column [B] what suits it in column [A] :

(A)	(B)
1. Stems	a. make food for the plant.
2. Roots	b. gives leaves their green color.
3. Leaves	c. support leaves and flowers of the plant.
4. Chlorophyll	d. fix the plant in the soil.

1.

2.

3.

4.

narrow
needles
pine tree
impossible

صيق
الزبر
شجرة الصوبر
مستحيل
flat
wide
starches

مسطح
عريض
الشجوات
fats
breathe
phloem

الدهون
يتنفس
اللحاء

Activity 10 Up the Stem

In this activity, we will observe how water and nutrients move from the roots of a plant up through the stem to its leaves and flowers and how transport vessels (xylem) in a plant work to help it stay alive.

Tools



Celery stalk



Glass cup containing water



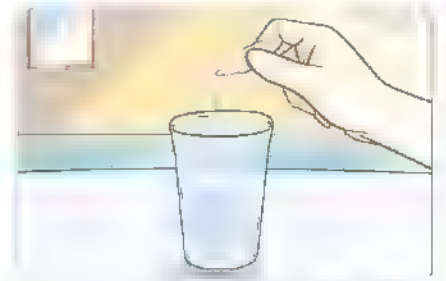
Food coloring



Scissors

Steps

1. Fill the cup with water, then add some drops of food coloring to the water.
2. Use the scissors to cut about 2 cm off the bottom of the stalk and place it in the cup of water.
3. Leave the stalk in the water cup until the next day.



4. Cut across the celery stalk, about 5 cm up from the bottom and observe the xylem vessels inside the stalk.



► Observations

- The color of xylem will be turned into the same color of the water in the cup.
- Also, the color of leaves of celery will be turned into the same color of the water in the cup.



► Conclusion

Water is transported through the xylem in the stem and move to the leaves through the smaller vessels of xylem that connect the stem to the leaves.



Check Your Understanding

► Put (✓) or (x) :

1. Water is transported through the xylem in the plant's stem and leaves. ()
2. Xylem helps carry water upward the plant. ()

In the Assessment Book :

Try to answer :

Self Assessment (4)

Exercises on Lesson 4

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- 1. The plant's anchor it in the soil.
a. leaves b. stems c. roots d. flowers
- 2. There are in the plant's roots that help the plant to get more water and nutrients.
a. vessels b. root hairs c. stomata d. flowers
- 3. plant has climb stem.
a. Potato b. Tomato c. Vine d. Pine
- 4. The kind of stems that extend underground are called
a. climb stems. b. tubers. c. runners. d. wood stems.
- 5. Potato plant has stem.
a. upright b. climb c. tuber d. runner
- 6. Apple trees have
a. wood stems. b. climb stems. c. tubers. d. runners.
- 7. tree has narrow leaves.
a. Potato b. Pine c. Acacia d. Grapes
- 8. The green plants can make their own food through
a. roots. b. stems. c. leaves. d. flowers.
- 9. The green color of plant's leaves is due to the presence of
a. xylem. b. phloem. c. chlorophyll. d. stomata.
- 10. Food materials are transported from the leaves to other parts of the plant through ...
a. xylem. b. phloem. c. chlorophyll. d. stomata.
- 11. Animals and humans need to breathe.
a. oxygen gas b. carbon dioxide gas
c. water vapor d. sugar
- 12. Green plants produce all the following substances during photosynthesis process, except
a. oxygen gas. b. carbarn dioxide gas.
c. starches. d. fats.

Put (✓) or (X) :

- 1. The plant is fixed in the soil by the help of its roots. ()
- 2. Plant's stem has hairs that absorb oxygen gas from the air. ()
- 3. Xylem helps the plant to get water from the soil. ()
- 4. A tree trunk is a type of stems called runners. ()
- 5. Potato plants have stems called tubers. ()
- 6. Chlorophyll in plant's roots absorbs sunlight. ()
- 7. The leaves of pine trees are flat and wide. ()
- 8. Phloem transports food materials downward from the leaves to other parts of the plant. ()
- 9. Photosynthesis process produces carbon dioxide gas that help animals and humans to breathe. ()
- 10. Plants need sunlight, oxygen gas and water to make its own food. ()
- 11. Vines have a kind of stems called climb stems. ()
- 12. During photosynthesis process, the plant makes sugars, starches, proteins and fats that help it to survive. ()
- 13. Chlorophyll helps the plant leaves to absorb sunlight to make photosynthesis process. ()

Write the scientific term of each of the following :

- 1. Small structures in the plant's roots that increase the absorption of water and nutrients from the soil. (.....)
- 2. A part of the plant that fix it in the soil. (.....)
- 3. A part of the plant that supports its leaves and flowers. (.....)
- 4. The kind of plant's stem in vines. (.....)
- 5. The stems that are extended above and along the ground. (.....)
- 6. A plant that has a tuber stem. (.....)
- 7. It is found in plant's leaves that gives them green color and absorbs energy from the sunlight. (.....)
- 8. Tubes in the plant that transport food materials from the leaves to other parts of the plant. (.....)
- 9. A gas produced during photosynthesis and is needed for respiration of living organisms. (.....)



Correct the underlined words :

1. Plant's leaves help it to be fixed in the soil. (.....)
2. The plant can absorb more water and nutrients from the soil by the help of xylem that are found in the roots. (.....)
3. Tree trunks are climb stems. (.....)
4. Potato plant's stems called runners that extend underground. (.....)
5. The stems that extend above and along the ground are called tubers. (.....)
6. Most flowers have wood stems. (.....)
7. Animals and people can't live without carbon dioxide gas to breathe. (.....)
8. The leaves of pine trees are flat and wide. (.....)
9. Chlorophyll in plant's roots absorbs energy from the sunlight. (.....)
10. Xylem tubes inside the leaves transport food materials downward from the leaves to other parts of the plant. (.....)



Complete the following sentences :

1. The presence of _____ in plant's roots help it to absorb more _____ and nutrients from the soil.
2. There are many kinds of stems on plants like _____ in vines and _____ in potato.
3. Plant's roots _____ the plant in the soil and absorb _____ and water from the soil.
4. Shrubs have _____ stems, while most flowers have _____ stems.
5. The stems that are extended above the ground are called _____.
6. Pine trees have _____ leaves that look like _____.
7. Plant's leaves during photosynthesis process produce _____, starches, fats and _____ that the plant needs to survive.
8. Food materials that are produced by _____ process are transported from the leaves to the other parts of the plant through tubes called _____.
9. The green color of plant's leaves is due to the presence of _____ that absorbs energy from _____.

Give reasons for :

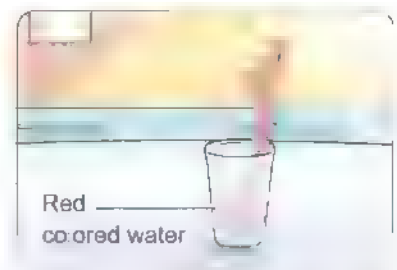
1. There is no life on Earth in the absence of plants.
2. Chlorophyll in plant's leaves has an important role in photosynthesis process.
3. The presence of hairlike structure in plant's roots.

What happens if ...?

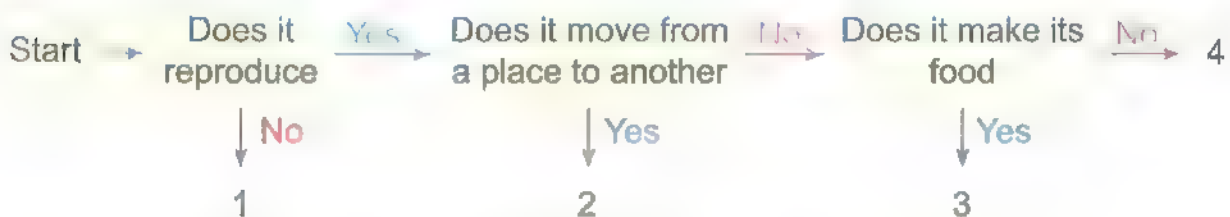
1. Plant's leaves don't contain chlorophyll.
2. The plant doesn't have roots.
3. The plant stop making photosynthesis process for several days.

Look at the opposite figure then answer :

- a. The color of leaves of celery will be
- b. Water is transported through that connect the stem to the leaves.



Observe the following diagram then choose the correct answer .



Which of the following represents a celery plant ?

- a. 1
- b. 2
- c. 3
- d. 4

LESSON

5

Activity 11

Comparing Plant and Human Systems

► Put (✓) or (x) :

1. Plant needs water and air like human to survive. ()
2. Plant doesn't need energy like human to grow. ()

Now, we will determine how human systems might be similar to plant systems.

Need for energy

Both plants and humans need energy and gases from the air to survive and grow.

Plants

- Plants can manufacture their own energy in the form of glucose through photosynthesis process.

Glucose :

It is the plant sugar that is produced during photosynthesis and provides energy for the plant to survive and grow.

- Gases enter plants through the leaves.

Humans

- Humans must eat food throughout the day to get energy, as they chew and swallow the food, nutrients are absorbed into the blood.
- Air enters the human body through the nose and mouth then travels to the lungs, where oxygen is absorbed into circulating blood.

Human circulatory system

- The human circulatory system consists of the heart and blood vessels (tubes).
- The blood vessels in the human circulatory system transport nutrients and oxygen through the blood to the body cells.
- The human circulatory system has two different types of vessels which are arteries and veins.

Circulatory system :

It is the system that transports blood and other fluids throughout the body.



Human circulatory system

comparing
manufacture
chew
fluids

مقارنة
يصنع
يمضغ
سوائل
swallow
circulating
blood

يسلع
دائر
الدم
circulatory system
arter es
veins

الجهاز الدوري
شرب
أوردة

- Blood moves in only one direction in a human's arteries or veins, where :

Arteries carry blood that is rich with oxygen and nutrients (glucose) from the heart to the body cells, so that the body can grow.

Veins return the blood that carries carbon dioxide and is low in nutrients and oxygen back to the heart, then to the lungs where the blood carries oxygen again.

Note

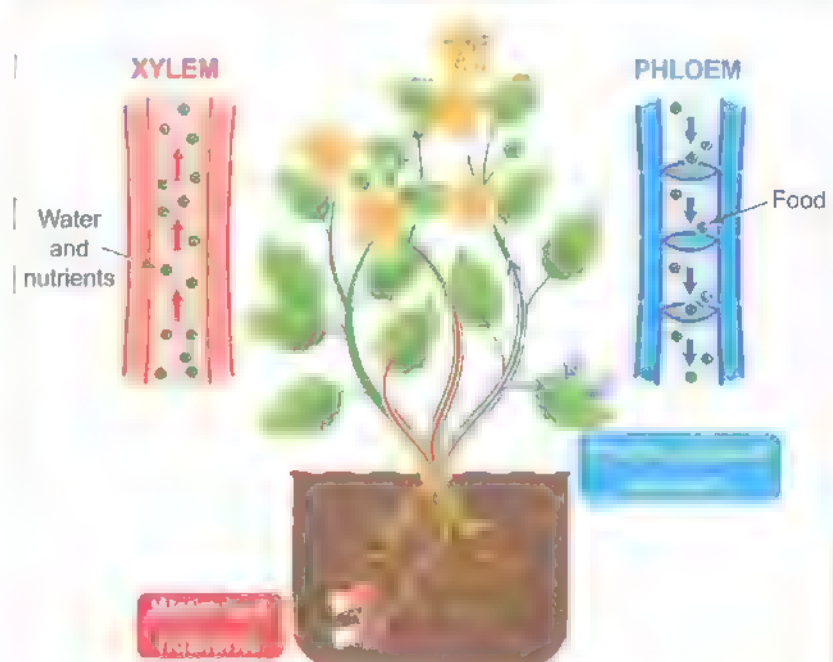
You can probably see your veins and arteries through your skin on your hands or arms.

Comparing the human body to plants

- Like the human body, a plant needs energy to grow.
- In plants; water, nutrients and the plant food formed during photosynthesis are all move through a system of tubes or vessels called the transport system.
- Similar to the way arteries and veins pump blood in a specific direction to and from the heart, the transport system in plants have one-way vessels that move important substances between the parts of the plant.

Transport system of plants

- Water and nutrients taken up by the roots through **xylem** are transported to the leaves to make the plant food.
- When the water arrive to the leaves, they begin to produce glucose sugar.
- The **phloem** carries the glucose sugar downward into all other parts of the plant to grow.



- The following table shows the similarities and differences between the plant transport system and the human circulatory system :

Plant transport system

[Similarities]

- Both have systems of vessels to transport water, nutrients and gases.
- Both have one-way vessels (tubes).

[Differences]

- | | |
|---|--|
| <ul style="list-style-type: none"> - The transport system in plant is a system of tubes called xylem and phloem that transport different materials around the plant parts. - Xylem tubes carry water and nutrients from the roots to the leaves. - Phloem tubes carry sugars from the leaves to all plant parts. | <ul style="list-style-type: none"> - The transport system in human is the circulatory system that moves blood around the human body. - Arteries carry blood that is rich with oxygen and nutrients from the heart to all body parts. - Veins carry blood that contains carbon dioxide and is low in nutrients and oxygen from all body parts back to the heart. |
|---|--|



Check your understanding

- Put (✓) or (x) :

- | | |
|--|---------|
| 1. Both plants and humans must take in gases from the air. | () |
| 2. Veins carry blood rich in oxygen and nutrients. | () |
| 3. Phloem tubes carry water to leaves. | () |
| 4. Vessels in plants and humans systems are one-way vessels. | () |



Digital Extension Activity

Activity (12) " Obtaining Materials " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 13 Plant Food

Plant Food

- Plants have some structures that take in water and nutrients from the soil and move them to other parts of the plant.
- Plants also have other structures that absorb sunlight and take in carbon dioxide from air.
- In plant's leaves, sunlight helps water combine with carbon dioxide to make glucose sugar which is used by plant cells for food.
- Sunlight provides the energy needed for this food-making process.
- During photosynthesis process, light energy of the Sun is transformed into chemical energy that is found in glucose.



Glucose for energy

- Phloem moves glucose from the leaves to the other parts of the plants.
- Plant cells use glucose as a source of energy to live and grow.
- During photosynthesis process, the plant also produces oxygen and water which are released into the air.
- Other living organisms, such as animals and humans, depend on the oxygen that plants release during photosynthesis process for their respiration.



Check your understanding

► Arrange the following sentences to describe the process that converts energy from the Sun into food in the correct order

- (.....) Vessels move glucose from the leaves to other parts of the plant.
- (.....) Plant releases oxygen that other living organisms need for respiration.
- (.....) Light from the Sun hits plant's leaves.
- (.....) Plant parts use the glucose for their needs and growth.
- (.....) The leaves transform light energy from the Sun into glucose (chemical energy).

Digital Extension Activity

Activity (14) "Leaves and Food Production" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 15 Flowers and Seeds

You have learned that the plant's leaves play an important role in the photosynthesis process to make its own food from some materials such as water, sunlight and air.

Flowers of plants

- Some plants have large colorful flowers.
- Some other plants, such as grasses, have very small flowers and some flowers are not very colorful.
- Flowers are the reproductive parts of many plants.

Plant reproduction :

It is the process of making new plants.

Function of the plant's flowers :

Flowers produce seeds for the plant that help the plant to reproduce.

- When seeds receive air, water and the correct temperature, they can grow into a new plant.

Notes

1. In the sunflower, the seeds are the small dark-colored objects in the center of this flower.
2. Plants use the food they make to produce flowers which are responsible for reproduction.



Check your understanding

► Put (✓) or (x) :

1. In plants, all flowers are responsible for reproduction. ()
2. When seeds receive air and correct temperature only, they grow into a new plant. ()

In the Assessment Book :

Try to answer :

Self-Assessment ⑤

colorful
grasses
reproduction

ملون
الأعشاب
التكاثر
reproductive
seeds
correct

تكاثر
بذور
مناسبة
temperature
sunflower
responsible

درجة الحرارة
دوار / عباد الشمس
مستقل

Exercises on Lesson 5

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. During photosynthesis process, the plant produces . . . that provides it with energy to survive.
 - a. carbon dioxide gas
 - b. water
 - c. glucose sugar
 - d. oxygen gas
2. . . . carry blood which is rich with oxygen and glucose from the heart to the body cells.
 - a. Arteries
 - b. Veins
 - c. Lungs and veins
 - d. Brain and veins
3. Blood rich in carbon dioxide gas return back to the heart through . . .
 - a. arteries.
 - b. veins.
 - c. lungs.
 - d. xylem.
4. . . . system in plants consists of tubes that water and nutrients move through it.
 - a. Digestive
 - b. Respiratory
 - c. Transport
 - d. Nervous
5. The system in human that moves blood in the human body is called system.
 - a. digestive
 - b. respiratory
 - c. circulatory
 - d. nervous
6. Glucose sugar is transported from the leaves to other parts of the plant through
 - a. xylem.
 - b. phloem.
 - c. roots.
 - d. stems.
7. In plant's leaves, light energy is converted into . . . energy during photosynthesis.
 - a. sound
 - b. electric
 - c. chemical
 - d. kinetic
8. Plants can produce new seeds by
 - a. roots.
 - b. leaves.
 - c. stems.
 - d. flowers.
9. The reproductive parts of many plants are called
 - a. veins.
 - b. roots.
 - c. leaves.
 - d. flowers.
10. In . . . , its seeds are small dark-colored objects in the center of this flower.
 - a. pine tree
 - b. sunflower
 - c. potato plant
 - d. celery

Put (✓) or (X) :

1. Air enters plants through their roots. ()
2. Living organisms need energy and gases from the air to survive and grow. ()

3. Human circulatory system consists of the heart and the lungs. ()
4. Arteries are vessels in human circulatory system that carry blood rich in carbon dioxide gas. ()
5. Oxygen and glucose are transported from the heart to the body cells through arteries. ()
6. Phloem transports water and nutrients from the roots to the leaves. ()
7. Glucose is a type of sugar that is produced from plants during photosynthesis process. ()
8. The reproductive parts of many plants are flowers. ()

Correct the underlined words :

1. Flowers of plants produce root hairs that help the plant to reproduce. ()
2. Blood rich with oxygen gas is carried by veins from the heart to the body parts. ()
3. Human circulatory system consists of the lungs and blood vessels. ()
4. Each of xylem in plants and veins in human are two-ways vessels. ()
5. Phloem tubes carry water and nutrient from the roots to the leaves. ()
6. Veins carry blood rich in oxygen and nutrients. ()
7. During photosynthesis process, light energy is transformed into sound energy. ()
8. Plants make glucose during respiration process that provides them with energy. ()

Write the scientific term of each of the following :

1. A type of sugar produced by the plant during photosynthesis process. ()
2. Blood vessels carry blood from the heart to all body parts. ()
3. Blood vessels carry blood from the body parts and return it back to the heart. ()
4. The human body system that is responsible for transportation of blood and other fluids throughout the body. ()
5. A system of tubes through which water, nutrients and plant food are carried all over the plant. ()
6. Parts of the plant that are responsible for reproduction. ()
7. The process of producing new plants. ()

Complete the following sentences :

1. Plants make their energy in the form of _____ sugar during photosynthesis process.
2. Air enters plants through stomata on their _____, while it enters the human body through _____ and _____.
3. Human circulatory system consists of _____ and _____.
4. Arteries carry blood rich in _____ and oxygen from the heart to _____.
5. The blood and other fluids are transported throughout the body by the _____ system.
6. The plant makes sugar in its _____ during photosynthesis process.
7. Transport system in the plant consists of two types of vessels which are _____ and _____.
8. Arteries carry oxygen and nutrients from the _____ to all body parts, while _____ in plant's stem carry water from the _____ to the leaves.
9. In plant's leaves, _____ energy is converted into _____ energy during photosynthesis process.
10. Flowers of the plant produce _____ that help it to _____.
11. There are two types of vessels in the human circulatory system which are _____ and _____.

Give reasons for :

1. Flowers are important parts for the plant.

.....

.....

2. Circulatory system has an important role for human to survive.

.....

.....

3. Xylem in plant is a one-way vessel.

.....

.....

What happens if ...?

1. Plants can't produce glucose sugar during photosynthesis process.

.....

.....

2. Humans don't have circulatory system.

3. We remove the flowers of a plant.

 Look at the opposite figure, then answer the questions :

a. Label the figure :

(1)

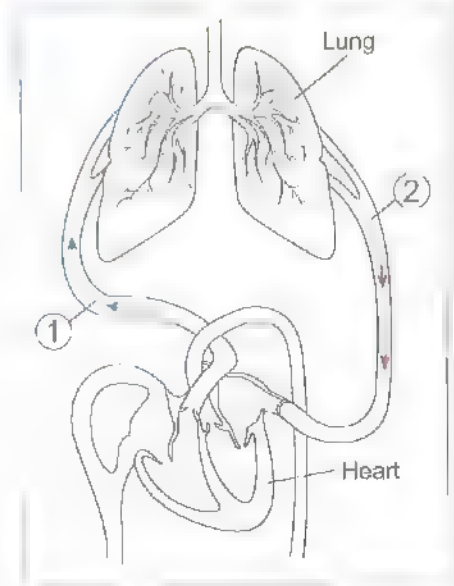
(2)

b. Vessel number transfers blood rich in carbon dioxide gas, while vessel number transfers blood rich in oxygen gas.

c. Choose the correct answer :

Vessels number (1) and (2) belong to system.

- | | |
|----------------|----------------|
| a. digestive | b. respiratory |
| c. circulatory | d. nervous |



LESSON

6

Activity 16 Seed Dispersal

► Look at the opposite picture, then put (✓) or (✗)

1. Plants use the energy they get from the food they make to produce seeds. ()
2. Seeds fall from the plant to grow up in another place. ()



Seeds are transported from one place to another, this process is called seed dispersal.

Ways of Seed Dispersal in nature

1. Floating on water of rivers or lakes.
 2. Traveling by wind.
 3. Sticking to animal fur or human clothes.
 4. Being eaten by animals and comes out with their stool.
- In this activity, we will investigate how seeds move from one place to another.

► Look at the following seeds in the pictures below, then decide how you think the seeds in the pictures move from one place to another



Coconut seed



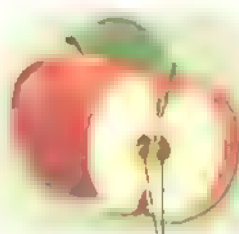
Maple seeds



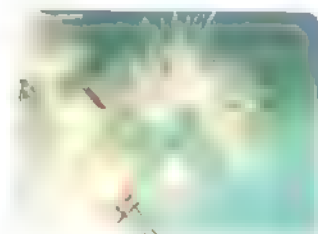
Tomato seeds



Burdock seeds



Apple seeds



Dandelion seeds

nature
float
rivers
dandelion seeds

الطبيعة
يطفو
الأنهار
بذور الهندباء

lakes
stick
fur
investigate

البحيرات
يلصق / يعلق
فراء
مبحث

stool
coconut seed
maple seeds
burdock seeds

مبراز
بذرة جوز الهند
بذور القيقب
بذور الأرطيون

Ways of seeds dispersal

Floating on water	Coconut seed
Traveling by wind	Maple seeds – Dandelion seeds (both of them are light seeds)
Sticking to animal fur	Burdock seeds (have spines)
Being eaten by animals	Tomato seeds – Apple seeds



Check your understanding

► Put (✓) or (x) :

1. Light seeds travel in the air. ()
2. Seeds with spines stick to animal fur. ()

Activity 17 Record Evidence Like A Scientist

You have learned a lot about plant needs and plant structures.

In this activity, which will be repeated at the end of each concept, we will learn how to think like scientists to answer a question about one of the main points of this concept through four main steps :

- **Step ①** : The Question.
- **Step ②** : My Claim.
- **Step 3** : My Evidence.
- **Step 4** : My Scientific Explanation.

? Step ① The Question

How do the structures of a plant use water, air and light to perform life processes ?

Step ② My Claim

- Plants use specialized structures to obtain their basic needs of water, air and light.
- Each part of a plant has a function to help it survive.

💡 Note

Your claim should be formed of a sentence that gives an answer for the previous question in step ①.

Step ③ My Evidence

- In most plants, the roots soak up water and nutrients from the soil and then the stem moves the water up to the leaves.
- If a green plant is placed in a dark place for many days, their leaves will turn yellow and the plant will die, so green plant needs sunlight to survive.

💡 Note

You should mention enough and suitable evidence that support your claim.

4 My Scientific Explanation

- Plant roots absorb water and nutrients from the soil, then the stem transports them to the leaves through xylem.
- Plant leaves absorb carbon dioxide from air through stomata and absorb the sunlight through chlorophyll.
- During photosynthesis, green leaves use the light energy from the Sun to combine the carbon dioxide from the air with water to produce glucose sugar (plant's food) and oxygen gas that all living organisms need to breathe.



Note

Your scientific explanation should explain your claim and evidence introducing some supportive examples from what you have learned.



Digital Extension Activity

Activity (18) " Farmers Growing Plants : Irrigation " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 19**Review Plant Needs**

► We can summarize this concept in the following main points :

- Plants need water, air, sunlight and nutrients from soil as basic needs to live and grow.
- Soil may not have been included as a basic plant need because :
 - Some plants only grow in the water.
 - Some plants grow on other plants instead of having roots in the soil.
- The seeds can grow without soil if they have water and Sun.
- Plants can grow without soil for a while, but finally they need soil.
- Plants make their own food through the photosynthesis process.

Photosynthesis process

It is the process through which plants use the energy in sunlight to make their own food.

- Green plants use their leaves to collect sunlight and carbon dioxide from the air.
- Light is important to plant growth, because plants use light to make their own food, so the plant without light does not grow well because it had less food.

Functions of the plant roots :

- Roots fix the plant in the soil.
- Roots absorb water and nutrients from the soil, which are needed to make food of plants.
- Plant roots have hairlike feature called **root hairs** that increase the amount of absorbed water and nutrients that the plant needs.

Functions of the plant stem :

- Stem transports water and nutrients to the rest of the plant through xylem.
- Stem supports leaves and flowers of the plant.

There are many forms of stems :

- Some plants have a **wood stem**, such as tree trunks and shrubs.
- Most flowers have **upright stems**.
- Some plants have a **climb stem**, such as vines (grapes).
- Some stems extend underground and they are called **tubers**, such as potato plant.
- Some stems extend above and along the ground and they are called **runners**.

- **Function of the plant leaves :**

Leaves make food for the plant through photosynthesis process.

- Leaves need water, carbon dioxide gas and sunlight to make food.
- The air that the plant need moves into the leaves through tiny openings called stomata.

Stomata

They are pores on the surface of plant's leaves that allow gases to move into and out of the plant.

- Leaves contain **chlorophyll**, which gives them their green color.
- Chlorophyll captures energy from the sunlight.

- **There are two kinds of leaves :**

- **Narrow** leaves that look like needles, such as pine trees.
- **Flat, wide** leaves.

-
- Photosynthesis is a process that takes place inside the leaves.
 - During photosynthesis, green leaves use the light energy from the Sun to combine the carbon dioxide from the air with water to produce :
 - Nutrients (such as sugars, starches, fats and proteins) that the plant needs to live.
 - Oxygen gas that animals and people need to breathe.
 - As the photosynthesis process is completed inside the leaves, there are tubes called **phloem** that transport the food materials downward, from the leaves to the other parts of the plant.
 - Water is transported through the xylem in the stem and move to the leaves through the smaller vessels of xylem that connect the stem to the leaves.

-
- The human circulatory system consists of the heart and blood vessels.

Circulatory system :

It is the system that transports blood and other fluids throughout the body.

- The following table shows the similarities and differences between the plant transport system and the human circulatory system :

Plant transport system	
[Similarities]	
<ul style="list-style-type: none"> - Both have systems of vessels to transport water, nutrients and gases. - Both have one-way vessels. 	
[Differences]	
<ul style="list-style-type: none"> - The transport system in plant is a system of tubes called xylem and phloem that transport different materials around the plant parts. - Xylem tubes carry water and nutrients from the roots to the leaves. - Phloem tubes carry sugars from the leaves to all plant parts. 	<ul style="list-style-type: none"> - The transport system in human is the circulatory system that moves blood around the human body. - Arteries carry blood that is rich with oxygen and nutrients from the heart to all body parts. - Veins carry blood that contains carbon dioxide and is low in nutrients and oxygen from all body parts back to the heart.

- During photosynthesis process, light energy of the Sun is transformed into chemical energy that is found in glucose.
- During photosynthesis process, the plant also produces oxygen and water which are released into the air.
- Flowers are the reproductive parts of many plants.
- **Function of the plant's flowers :**
Flowers produce seeds for the plant that help the plant to reproduce.
- When seeds receive air, water and the correct temperature, they can grow into a new plant.
- Seeds are transported from one place to another, this process is called **seed dispersal**.
- **Ways of seed dispersal in nature :**
 1. Floating on water of rivers or lakes.
 2. Traveling by wind.
 3. Sticking to animal fur or human clothes.
 4. Being eaten by animals and comes out with their stool.

In the Assessment Book

Try to answer

- Self-Assessment 6
- Model Exam on Concept (1 1)

Exercises on Lesson 6

● Understand

□ Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

1. The movement of seeds from a place to another is called
 - a. seeds germination.
 - b. seeds dispersal.
 - c. seeds reproduction.
 - d. seeds growth.
2. All the following can help in seed dispersal, except ..
 - a. wind.
 - b. water.
 - c. human and animals.
 - d. soil and sunlight.
3. Maple seeds travel by wind because they are
 - a light seeds.
 - b spiny seeds.
 - c heavy seeds.
 - d smooth seeds.
4. Burdock seeds have spines, so they can
 - a. float on water.
 - b. travel by wind.
 - c. stick to animal fur.
 - d. be eaten by animals.
5. From the ways of seeds dispersal is floating on water as in
 - a. burdock seeds.
 - b. tomato seeds.
 - c. dandelion seeds.
 - d. coconut seeds.

2 Choose from columns (B) what suits it in column (A) :

(A)	(B)
1. Coconut seeds	a. sticking to animal fur.
2. Maple seeds and dandelion seeds	b. floating on water.
3. Burdock seeds	c. being eaten by animals.
4. Tomato seeds and apple seeds	d. traveling by wind.
	e. staying inside flowers without movement.

1. 2. 3. 4.

3 Put (✓) or (X) :

1. Plant's seeds are formed inside the flowers. ()
2. Seeds germination means the transportation of seeds from one place to another. ()

- 3. There are many ways of seeds dispersal in nature. ()
- 4. Coconut seeds can float on water. ()
- 5. Dandelion seeds have spines, so they stick to animal fur. ()
- 6. Tomato seeds are light so they can disperse through air. ()
- 7. Human could be one of the ways of seed dispersal. ()

4 Correct the underlined words :

- 1. Coconut seeds disperse by wind. (.....)
- 2. Burdock seeds are light seeds. (.....)
- 3. Tomato and coconut seeds being eaten by animals and come out with their stool. (.....)

5 Complete the following sentences :

- 1. Some seeds can be transported from one place to another by floating on water as seeds or traveling by wind as seeds.
- 2. Burdock seeds can stick to animal fur because they have
- 3. Maple seeds and dandelion seeds can travel by wind because they are

6 Give reasons for :

- 1. Seeds dispersal may take place by animal in two different ways.
.....
- 2. Seeds of maple or dandelion plants can disperse through wind easily.
.....
- 3. Burdock seed can stick to animal fur.
.....

Model Exam on Concept 1.1

Total mark

20

(5 marks)

 (A) Choose the correct answer :

- All the following can help in seed dispersal, except
 - wind.
 - water.
 - human and animals.
 - soil and sunlight.
- Blood rich in carbon dioxide gas return back to the heart through
 - arteries.
 - veins.
 - lungs.
 - xylem.
- plant has climb stems.
 - Potato
 - Tomato
 - Vine
 - Pine
- Plants produce . . . during photosynthesis process.
 - water and glucose
 - oxygen gas and glucose
 - carbon dioxide gas and water
 - glucose and carbon dioxide

(B) What happens if ... ?

We put a seed of bean in a soil.

[illegible]

(A) Put (✓) or (X) :

1. Plants have unique structures that help them make their own food using sunlight. ()
2. Light is important for plant growth. ()
3. Plant's stem has hairs that absorb oxygen gas from the air. ()
4. Glucose is a type of sugar that produced from plants during photosynthesis process. ()

(B) Give a reason for the following :

Burdock seeds can stick to animal fur.

A Write the scientific term of each of the following :

1. A liquid substance that plants, animals and human need to survive. (.....)
2. Parts of the plant that are responsible for reproduction. (.....)
3. The source of energy of plant to make photosynthesis process. (.....)
4. The plant that has a tuber stem. (.....)

(B) Look at the following figures then complete the following sentences using the words below :

(Soil – figure (A) – figure (B))

1. The seeds in grow faster than these in
2. Seeds in figure (B) should be transferred into to complete its growth.

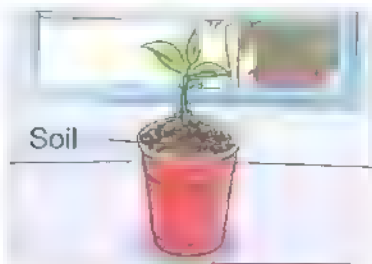


Figure (A)



Figure (B)

(A) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Roots	a. allow gases to come in and out the plant.
2. Stems	b. collect sunlight and carbon dioxide gas which combines with water to help the plant to make its own food.
3. Leaves	c. absorb water and nutrients from the soil.
4. Stomata	d. transport nutrients and water from the roots to all parts of the plant.
	e. absorbs oxygen gas from the soil.

1. 2. 3. 4.

(B) Correct the underlined words :

1. Chlorophyll in plant's roots absorbs energy from the sunlight. (.....)
2. During photosynthesis process, light energy is transformed into sound energy. (.....)

Concept

1.2

Energy Flow in Ecosystems



n



Learning outcomes

By the end of this concept, your child will be able to :

- Develop a model to show how energy moves through an ecosystem.
- Create a model to explain the different roles that organisms play in an ecosystem.
- Explain how the health of each type of organism in an ecosystem impacts the overall health of the community.

Key vocabulary

- | | |
|---------------|-------------|
| • Consumers | • Cycle |
| • Decomposers | |
| • Ecosystem | |
| • Food chain | • Food web |
| • Interact | • Predators |
| • Prey | • Producers |
| • Scavengers | |

Notes For Parents On Concept (13)

Lessons	Activities	What you should do with your child
1	Activity 1	Explain to your child how does energy flow through an ecosystem from plants to animals and between animals when they eat each other.
	Activity 2	Discuss with your child how hawk gets energy in an ecosystem.
	Activity 3	Digital extension activity.
	Activity 4	Digital extension activity.
	Activity 5	Explain to your child how animals eat food according to what these animals bodies need to survive.
	Activity 6	Discuss with your child the Sun is the primary source of energy for all organisms on Earth to live and how different living organisms get energy
2	Activity 7	Explain to your child living organisms can be classified into three groups according to their way of feeding.
	Activity 8	Discuss with your child how the movement of energy and nutrients through an ecosystem can be represented using model known as a food chain.
3	Activity 9	Let your child make a model of a food chain.
	Activity 10	Explain to your child how all living organisms interact in food webs and we can draw these webs to show how organisms are connected within ecosystem
4	Activity 11	Let your child make a model of a food web using animals cards.
5	Activity 12	Discuss with your child how the food web is a model that shows many interactions among living organisms in an ecosystem.
	Activity 13	Digital extension activity.
	Activity 14	Explain to your child how decomposers organisms make decomposition process.
	Activity 15	Digital extension activity.
6	Activity 16	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 17	Discuss with your child how restoration ecology is very important for plants and animals that help them have a stable environment to survive.
	Activity 18	Let your child review the main points in this concept.

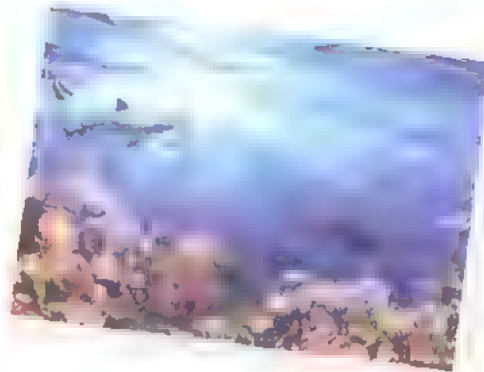
LESSON

1

Activity

1

Can You Explain?



- The pictures above show different types of organisms and their environments : You probably know a lot about ecosystem which includes plants, animals and even humans are all part of ecosystem.

Ecosystem :

It is an area (or community) that contains living organisms and nonliving things that interact with each other.

- The interaction between different components of an ecosystem depends on the flow of energy through these components.

► How does energy flow through an ecosystem ?

Energy flow (moves) through an ecosystem from plants to animals and between animals when they eat each other, then when living organisms die, their energy is returned to the soil.

► In this concept, we will study :

- What do animals eat.
- Food is energy.
- Food chains.
- Food webs and their interactions.
- Producers, consumers and decomposers.

environment
ecosystem
food web

بيئة
النظام البيئي
الشبكة الغذائية

interaction
components
flow

التفاعل
عناصر
تدفق

return
energy
food chain

يرجع / مدد
طاقة
السلسلة الغذائية

Activity 2

How Hawks Get Energy

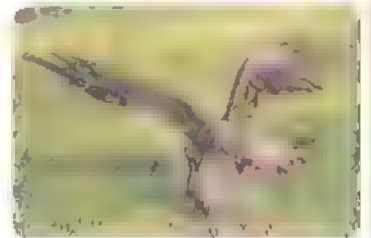
► Look at the opposite picture, then put (✓) or (x) :

1. Hawk can feed on rabbits and rats. ()
2. Hawk can feed on plant leaves. ()
3. Hawk hunts its prey to get energy. ()



Hawks in ecosystem

- Hawks get energy from food.
- Hawks generally eat different types of animals such as, snakes, mice, fish, birds, squirrels, rabbits and other small ground animals.
- Hawks do not eat plants, but they eat animals who eat plants, so they also depend on plants for energy.
- There are few predators that can attack hawks such as eagles or other hawks.



► What happens when the hawk dies ?

When a hawk dies, it decomposes and its energy is returned to the soil.



Check your understanding

► Put (✓) or (x) :

1. Hawks generally eat plant. ()
2. Hawks get their energy from animals only. ()
3. When a hawk dies, its energy is returned to the soil. ()



Digital Extension Activity

Activity (3) " All Animals Need Food to Survive " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.



Digital Extension Activity

Activity (4) " Decay " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 5

What Do You Already Know About Energy Flow in Ecosystems ?

- An ecosystem is a community that provides food, water and shelter to all living organisms live in it.
- There are many different ecosystems on the Earth such as ocean, a rainforest, a desert or the tundra.
- Animals don't choose the food they eat according to its taste, but they eat food according to what these animals bodies need to survive **such as** :



Caracal eats mouse



Rabbit eats grass



Bird eats butterflies and worms

► Why animals eat plants or other animals ?

Because animals need energy that comes from eating plants and other animals, as they cannot produce their own food.

Note

There is a relationship between sunlight and the energy we get from our food, because the energy we get from food originally comes from the Sun.



Check your understanding

- Complete the following sentences using the words

(Caracal – grass – Bird)

1. eats butterflies and worms.
2. Rabbit eats
3. eats mouse.

community
provide
rainforest

مجتمع
تزود / تمد
غابة مطيرة

shelter
ocean
tundra

مأوى / مسكن
محيط
سهل جليدي

caracal
originally

كاراكال / القط البري
في الأصل

Activity 6 Food is Energy

- We need energy to do all activities in our daily life such as thinking, breathing and moving.
- There are some activities require a lot of energy such as hard work or doing physical exercises.
- Our bodies still use some energy even when we sleep.



The primary source of energy

The Sun is the primary source of energy for all organisms on Earth to live, grow and carry out life processes.



► How different living organisms get energy ?

Living organisms can either produce their own food such as plants or get food from other organisms such as _____ including humans.

Plants

- Plants **can** make their own food through **photosynthesis** process by absorbing the sunlight through their leaves and use the sun's energy to convert water and carbon dioxide gas into glucose.

Animals

- Animals including humans **cannot** make their own food, but they get energy from the environment in which they live.
- Different animals can get their food by :
 - Eating plants only.
 - Eating other animals that eat plants.
 - Eating both plants and animals.

► From the previous explanation, we can conclude that :

The light energy of the Sun (radiant energy) is converted into chemical energy in plants during photosynthesis and then this energy is passed to animals and humans so, the main source of energy for all living organisms comes from the Sun.



Check your understanding

► Put (✓) or (x) :

1. Plants cannot make their own food. ()
2. The Sun is the primary source of energy for all organisms on the Earth. ()
3. There are some activities require a lot of energy such as hard work and sleep. ()

primary source
carry out
radiant energy

مصدر أولي
تنتج
طاقة إشعاعية

convert
chemical energy

تحويل
طاقة كيميائية

In the Assessment Book :

Try to answer

Self-Assessment ⑦

Exercises on Lesson 1

● Understand

○ Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

1. A community that includes living organisms and nonliving things is known as
 - a. digestive system.
 - b. respiratory system.
 - c. ecosystem.
 - d. vascular system.
2. The interaction that presents in an ecosystem occurs between
 - a. plants and nonliving things only.
 - b. animals and nonliving things only.
 - c. animals and plants only.
 - d. living organisms and nonliving things.
3. Living organisms that can absorb sunlight to make their own food are
 - a. animals only.
 - b. plants only.
 - c. humans and plants.
 - d. animals and plants.
4. Hawks get their energy from
 - a. plants only.
 - b. animals only.
 - c. plants and animals.
 - d. nonliving things.
5. Hawk eats a rabbit to get energy, this means that
 - a. the hawk is a prey.
 - b. the rabbit is a predator.
 - c. the hawk is a predator.
 - d. hawk and rabbit are predators.
6. All the following are considered as a source of energy for hawks, except
 - a. snakes.
 - b. birds.
 - c. squirrels.
 - d. seeds.
7. There is an energy flow between all the following two living organisms, except
 - a. a lion and a deer.
 - b. a tomato plant and a potato plant.
 - c. a human and a fish.
 - d. a predator and its prey.
8. Caracal obtains its energy by eating
 - a. shark.
 - b. grass.
 - c. mice.
 - d. butterfly.
9. Which one of the following living organisms can make its own food ?
 - a. Grass.
 - b. A worm.
 - c. A bird.
 - d. A rodent.
10. We need more energy during
 - a. watching TV.
 - b. sleeping.
 - c. listening to music.
 - d. physical exercises.

11. Plants can make their own food through process.
 - a. breathing
 - b. photosynthesis
 - c. digestion
 - d. reproduction
12. Leaves of green plants absorb the sunlight to combine water with to produce their own food.
 - a. oxygen gas
 - b. soil
 - c. carbon dioxide gas
 - d. roots
- 13. The primary source of energy for all living organisms on the Earth is ...
 - a. the Sun.
 - b. green plants.
 - c. glucose sugar.
 - d. photosynthesis process.
- 14. The energy that comes from the Sun is important for the photosynthesis process.
 - a. sound
 - b. light
 - c. kinetic
 - d. potential
- 15. All the following sentences are correct about photosynthesis, except
 - a. it depends on sunlight.
 - b. it produces glucose sugar and carbon dioxide gas.
 - c. it produces glucose sugar and oxygen gas.
 - d. it occurs in plant leaves.

 Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Carbon dioxide gas	a. without its energy, photosynthesis process cannot begin.
2. Oxygen gas	b. it combines with oxygen inside the plant leaves to produce glucose sugar.
3. Water	c. it is produced from photosynthesis process.
4. Sunlight	d. it is absorbed by plant roots from the soil.
	e. it combines with water inside the plant leaves to produce glucose sugar.

1. 2. 3. 4.

 Put (✓) or (X) :

1. There is no interaction between the components of an ecosystem. ()
2. The light energy allows carbon dioxide gas to combine with water inside the plant leaves to make glucose. ()
3. After death living organisms, all energies that present in their bodies go to the soil. ()

4. Hawks cannot eat some types of food like plant leaves. ()
5. There is no energy flow between living organisms that live in seas and oceans. ()
6. Birds eat insects as a prey to get their energy. ()
7. Dead organisms don't need energy. ()
8. There are some activities that don't need energy like listening to music. ()
9. We can live without moonlight, but we cannot live without sunlight. ()
10. Butterfly can produce its own food from sunlight. ()
11. Hard works or severe physical exercises need a lot of energy. ()

 Write the scientific term of each of the following :

1. A community that contains living organisms and nonliving things. ()
2. The process that takes place inside plants through which we can get oxygen. (.....)
3. It is a form of energy that changes into chemical energy during photosynthesis process. (.....)
4. It is the primary source of energy for all living organisms on the Earth. (.....)
5. A type of living organisms that can produce its own food by absorbing sunlight. (.....)
6. The sugar that is formed inside plants during photosynthesis process. (.....)
7. The gas that is present in air and necessary for the formation of plant food. (.....)
8. The gas that is produced from photosynthesis process. (.....)
9. Living organisms that both humans and animals need to survive. (.....)

 Complete the following sentences .

1. An area that provides food, water and shelter to all living organisms which live in it, is known as
2. All living organisms need to do their activities and to carry out their life processes.
3. Hawks attack rabbits to get their energy, while rabbits feed on to get their energy.
4. Sunlight energy converts and into glucose inside the plant leaves.

- 5. Both humans and animals cannot produce their own _____
- 6. The light energy that is produced from the _____ passes through all living organisms on the Earth.
- 7. Plants produce _____ and _____ during photosynthesis process.

6 Give reasons for :

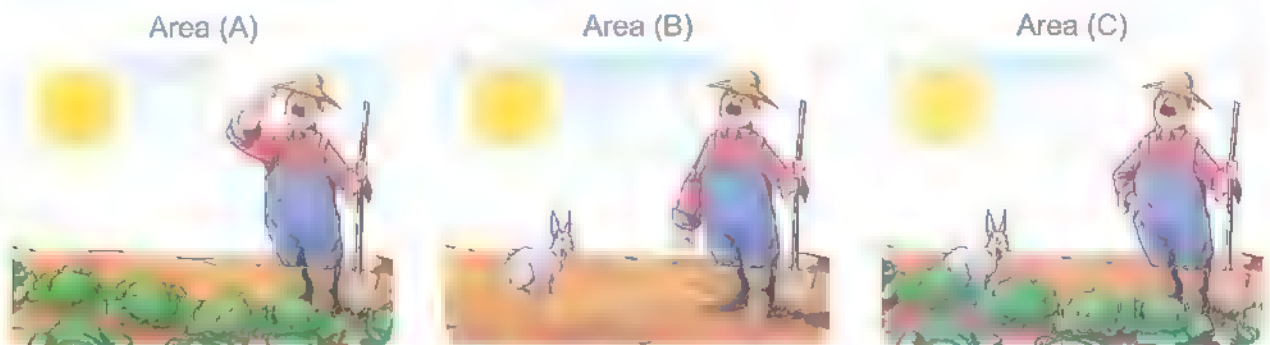
- 1. Human needs to eat some animals and plants.

- 2. Sunlight is important for all living organisms.

What happens if ...?

- 1. There is no sunlight reaches the Earth's surface.
- 2. A hawk is placed in an ecosystem that doesn't contain any living organisms except plants.

Study the following figures which show three different areas (A) , (B) and (C) , then complete the sentences below :



1. Areas (.....) and (.....) represent an ecosystem that contains two different living organisms, while area (.....) represents an ecosystem that contains three different living organisms.
2. Photosynthesis process doesn't occur in area (.....).
3. The sunlight energy is converted into chemical energy that is stored in the form of food in areas (.....) and (.....).
4. Energy flow can be occurred between animal and human in areas (.....) and (.....).

► Look at the opposite picture then put (✓) or (✗)

1. The energy that comes from food keep organisms alive. ()
2. Energy flows between living organisms through an ecosystem. ()



Energy for life

- All living organisms eat food to get the energy they need to survive.
- Living organisms feed on one another, so energy passes between them.
- Living organisms can be classified into three groups according to their way of feeding, which are :

1 Producers.

2 Consumers.

3 Decomposers.

1 Producers

- They are able to produce their own food in the form of glucose sugar which is rich with energy.

Producers :

They are organisms that can make their own food and don't consume (feed on) other plants or animals.

Example : Plants use energy from the Sun to produce their own food by photosynthesis process.



Note
Nearly all of the producers on the Earth are plants.

2 Consumers

- They cannot produce their own food.

Consumers :

They are organisms that eat other living organisms to get their energy, because they cannot make their own food.

Examples : There are three types of consumers which are :

Primary consumers

- They are animals that eat plants.
- Many insects are primary consumers.



- They are animals that eat the primary consumers.
- Birds are secondary consumers, because they eat insects and other organisms that eat plants.



- They are animals that eat the secondary consumers.
- Tertiary consumers are often large meat-eating animals like crocodiles.



3 Decomposers

- They recycle nutrients back into the ecosystem through the process of decomposition of dead organisms.

Decomposers :

They are organisms that carry out the process of decomposition by breaking down or decaying dead organisms.

Examples : • Fungi, bacteria, worms and millipedes.

Note

Worms and millipedes produce waste rich in nutrients that increase the soil fertility for plant growth.



millipede

► From the previous explanation, we can conclude that :

- Energy flows through an ecosystem between living organisms.
- The movement of energy and nutrients through an ecosystem can be represented using model known as a **food chain**.

primary consumers
secondary consumers
tertiary consumers
fungi

كائنات مستهلكة أولية
كائنات مستهلكة ثانوية
كائنات مستهلكة ثالثية
فطريات

recycle
nutrients
millipede
decomposition

إعادة تدوير
عناصر غذائية
الدودة الألفية
تحلل

worms
bacteria
decaying
fertility

الديدان
بكتيريا
تحلل
خصوبة

Food chain :

It is a model that shows one linear set of feeding relationships and movement of energy between living organisms.

Example :

► **From the above food chain, we can conclude that :**

- The **first** link in the food chain is plant, which is considered as a producer living organism because it uses the energy from the Sun to produce its own food.
- The **second** link in the food chain is mouse, which is considered as a primary consumer living organism because it eats plant, then we found that the snake is considered as a secondary consumer living organism because it eats mouse, then we found that the eagle is considered as a tertiary consumer living organism because it eats snake.
- In the **final** when the eagle dies, it decomposes by decomposers and its energy is returned to the soil which makes the food chain continuity.

**Check your understanding**

► **Complete the following sentences using these words :**

(**Producers – Decomposers – Consumers**)

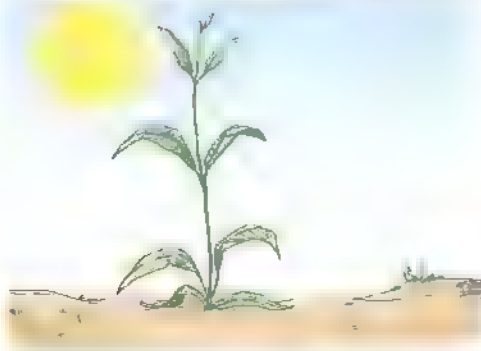
1. recycle nutrients back to the ecosystem.
2. are living organisms cannot produce their own food.
3. are able to make their own food in the form of glucose sugar which is rich with energy.

Activity 8 Energy Flow

- As you know that all organisms need energy to do their activities and this energy flows through an ecosystem.
- There are organisms that cannot get energy directly from the Sun, so they obtain their needed energy by eating other living organisms.
- You also learned that food chain shows the food relationships (energy relationships) among organisms in different ecosystems.

Example of a food chain

1 A green plant makes its own food using energy from sunlight.



2 A mouse eats the green plant to get energy.



3 Then a snake eats the mouse to get energy.



4 Then a hawk eats the snake to get energy.



So, we can form a food chain that shows the relationship among the previous living organisms as shown in the following diagram :



► **From the previous explanation, we can conclude that :**

- The energy from the Sun passes to the green plant, then to the mouse and snake then finally to the hawk.
- Green plant can make its own food using the sunlight, while animals like mouse, snake and hawk cannot.

Predator and prey

► **In the previous food chain, we can observe that :**

- The hawk and snake are "Predators", because they hunt other animals.
- The snake and the mouse are "Prey", because they are hunted by other animals for food.

So, both predators and prey pass food and energy through the food chain.



Notes

1. Any animal that is hunted and eaten by another animal is called "Prey".
2. Any consumer that hunts and eats another animal is called "Predator".



Check your understanding

► **Put (✓) or (x) :**

1. Any animal that is hunted and eaten by another animal is called predator.

()

2. In any food chain, the plant is considered as a prey.

()

3. The energy from the Sun passes to the mouse directly.

()

In the Assessment Book :

Try to answer :

Self-Assessment (8)

Exercises on Lesson 2

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. According to the way of feeding, living organisms are classified into ...
☐ two groups. ☐ three groups. ☐ four groups. ☐ five groups.
2. need energy to survive.
 a. Consumers only
 b. Decomposers only
 c. Consumers and decomposers only
 d. Producers, consumers and decomposers
3. Photosynthesis process produces
☐ glucose sugar in consumers. ☐ glucose sugar in producers.
☐ water in consumers. ☐ water in decomposers.
4. Which of the following living organisms can make their own food ?
 a. Hawks. b. Mice. c. Pine trees. d. Caracals.
5. Nearly all plants are considered as
 a. consumer organisms. b. nonliving things.
 c. decomposer organisms. d. producer organisms.
6. To obtain energy to survive,
☐ a producer eats a decomposer. ☐ a consumer eats a producer.
☐ a butterfly eats a hawk. ☐ a hawk eats a butterfly.
7. Living organisms that cannot make their own food are
☐ animals and plants. ☐ decomposers and producers.
☐ consumers and decomposers. ☐ consumers and producers.
8. Many insects are considered as
 a. producers. b. decomposers.
 c. primary consumers. d. secondary consumers.
9. The energy can flow directly
☐ from a plant to an eagle. ☐ from an ant to an eagle.
☐ from a snake to an eagle. ☐ from an eagle to a snake.
10. Which of the following food chains shows the correct way of energy flow through consumers ?
☐ Secondary consumer → primary consumer → tertiary consumer.
☐ Primary consumer → secondary consumer → tertiary consumer.
☐ Tertiary consumer → secondary consumer → primary consumer.
☐ Secondary consumer → tertiary consumer → primary consumer.

- 11. All the following organisms are consumers, except
 a. deers. b. crocodiles. c. rabbits. d. millipedes.
- 12. Any food chain starts with
 a. insects. b. plants. c. fungi. d. bacteria.
- 13. Decomposers always the soil.
 a. pollute b. damage c. benefit d. harm
- 14. Waste materials produced from millipedes and worms are rich in
 a. water. b. nutrients. c. oxygen gas. d. carbon dioxide gas.
- 15. are living organisms that can make their food directly from the light energy of the Sun.
 a. Worms b. Grasses only c. Trees only d. Grasses and trees
- 16. Consumers and decomposers must get to survive.
 a. chemical energy from the food b. sound energy from the Sun
 c. wind energy from the air d. electrical energy from a battery

Choose from column (B) what suits it in column (A)

(A)	(B)
1. Photosynthesis process	a. it produces nutrients which is important for soil fertility.
2. Respiration process	b. it produces light which is important for plants.
3. Decomposition process	c. it produces oxygen gas which is important for breathing.
	d. it produces carbon dioxide gas which is important for plants.

1. 2. 3.

3 Put (✓) or (X) :

- 1. Producers don't need consumers to survive. ()
- 2. All living organisms don't need energy to survive. ()
- 3. Glucose sugar that is produced by producers has a low amount of energy. ()
- 4. Some producers can live in hot sunny weather, but they cannot live in a completely dark room. ()
- 5. Producers and consumers use carbon dioxide gas for making their food. ()
- 6. Birds are secondary consumers, because they eat insects that feed on plants. ()
- 7. Eagle is a tertiary consumer, where it is a large meat-eating animal. ()
- 8. The first link in any food chain is a consumer. ()

- 9. Consumers depend on the Sun indirectly to get their food. ()
- 10. Recycling nutrients back to the ecosystem is the main function of the consumers. ()
- 11. The predator is a consumer that eats another animal. ()

Write the scientific term of each of the following :

- 1. A group of living organisms that can produce their own food. ()
- 2. A group of living organisms that can live on decaying organisms. ()
- 3. It is a process through which decomposers can recycle nutrients back into the soil. ()
- 4. It is a model that shows one linear set of feeding relationships and energy flow between living organisms. ()
- 5. The animal that is eaten by another animal. ()
- 6. The consumer that hunts and eats another animal. ()

Complete the following sentences :

- 1. Living organisms include _____, consumers and decomposers.
- 2. Producers can make _____ sugar which is rich in energy through _____ process.
- 3. Decomposers and _____ depend on producers to get their energy.
- 4. The most common producers are _____.
- 5. The light energy of the Sun cannot flow directly to consumers and _____.
- 6. In a food chain, the energy flows from _____ consumer to a secondary consumer.
- 7. Decomposers are responsible for _____, _____ nutrients to the soil, that are needed for plants growth.

6 Give reasons for :

- 1. Consumers depend on producers to get their energy.

- 2. Soil fertility depends on decomposers.

What happens if ... ?

- 1. All primary consumers disappear from a certain food chain.

- 2. All types of decomposers are absent from an ecosystem.

- Form the following food chain by using the given words between brackets, then complete the sentences below :

(Duck – Grasses – Fox)

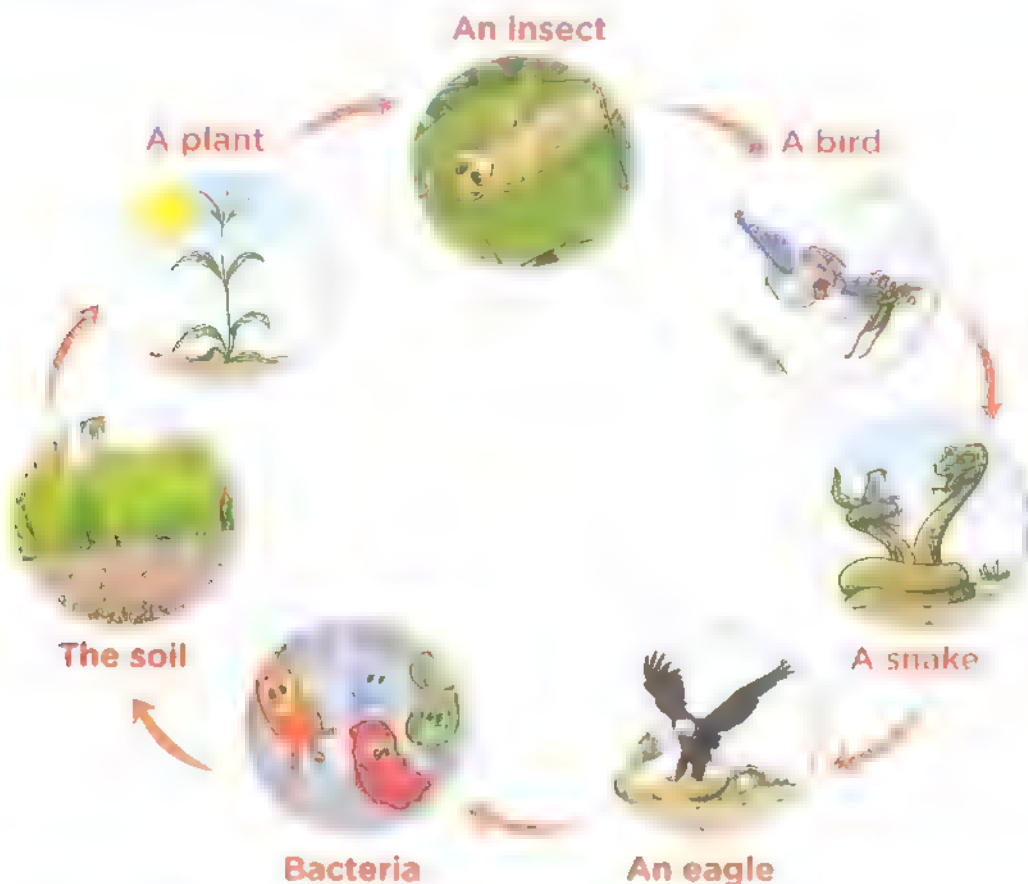
(1)

(2)

(3)

- This food chain doesn't contain consumer.
- The group of living organisms that is responsible for the final link of this food chain is
- Grasses change the energy of the Sun into energy during photosynthesis.

- Study the following figure that shows the recycling nutrients back into the soil, then complete the sentences below :



- Photosynthesis process is done by _____, so it is a producer.
- Decomposition process is done by _____, so they are decomposers.
- The insect is a _____ consumer, because it eats the plant.
- The large meat-eating animal is the
- When the eagle dies, its nutrients return back to the soil with the help of _____

LESSON

3

Activity 9 Food Chain

- You have learned that food chain is a model that shows the flow of energy among living organisms in an ecosystem.

Now, let's make a model of a food chain.

- Complete the following food chain model using these words :

(Bird – Grass – Snake – Hawk)

→ Grasshopper → → →



Give a reason for :

Some living organisms obtain their needed energy by eating other living organisms.

Because they cannot get energy directly from the Sun.



Quick Quiz

- Look at the following food chain. Then put (✓) or (X)



Grass → Beetle → Frog → Snake → Hawk

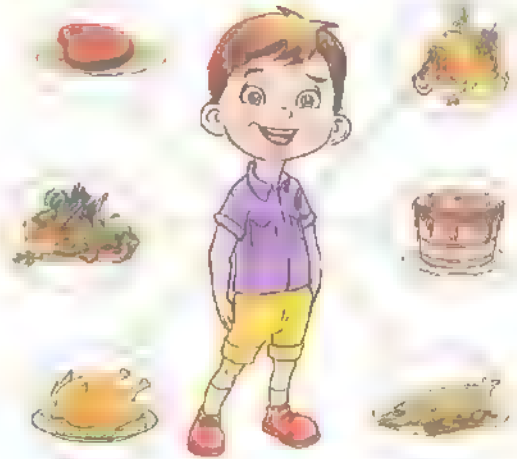
1. Beetle is considered as a producer living organism. ()
2. Frog is eaten by the snake. ()
3. Hawk is a predator living organism. ()
4. Frog is considered as tertiary consumer. ()

Activity 10 Food Webs

- There are different types of foods you eat, imagine those foods are connected to you by lines in a web.
- All living organisms including you, interact in food webs and we can draw these webs to show how organisms are connected within ecosystem.

Food web :

It is a model that shows many different feeding relationships among living organisms.



Interconnected food chains

- A food web is made up of several interconnected food chains, as we know food chains show the relationship of food and energy that passes from one organism to another, where :
 - As you have studied, the Sun provides energy for producers such as plants to make their own food during photosynthesis process.
 - Then, plants provide food for a series of consumers which may eat only plants or eat both plants and animals.
- So, the ways in which many food chains interact within an ecosystem form a food web.

Check your understanding

- Classify the following organisms in the table below :

(Hawks Grasses Insects Trees Groceries Mice)

Producers		
.....
.....
.....

In the Assessment Book :

Try to answer

Self-Assessment 9

imagine
connected
series

يتصور
متصل
سلسلة
lines
interact

خطوط
تفاعل
form
interconnected

شكل / تكوين
مترايط

Exercises on Lesson 3

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. All the following are types of food for primary consumers, except _____.
a. grasses. b. seeds. c. fruits. d. eagles.
2. Both animals and humans bodies
a. can absorb sunlight to make their own food.
b. cannot absorb sunlight to make their own food.
c. breathe carbon dioxide gas.
d. don't need water to drink.
3. A hawk can eat _____, when snakes are completely disappear from an ecosystem.
a. grasses b. grasshoppers c. birds d. leaves
4. It is better for any predator to depend on _____ to get its energy and survive.
a. one species of consumers only
b. many species of consumers
c. one species of decomposers only
d. many species of decomposers
5. All types of plants are similar in all the following characters, except they
a. are able to make photosynthesis process.
b. are eaten by primary consumers.
c. can feed on predators.
d. live in different types of ecosystems.
6. Human is a living organism.
a. producer b. consumer c. decomposer d. predator
7. Secondary consumers can eat only
a. decomposers. b. producers.
c. primary consumers. d. tertiary consumers.

 Put (✓) or (X) :

1. Living organisms depend on each other to get energy. ()
- 2. A hawk can get directly its needed energy by eating beetles. ()
- 3. There are some consumers that can eat both plants and animals. ()
- 4. In a food chain, the energy can pass from a producer to a nonliving thing then to a primary consumer. ()
- 5. Hawks, crocodiles and sharks are predators. ()
- 6. Human can eat plants and animals. ()
- 7. Food web is the interconnected food chains that shows many different feeding relationships. ()

 Complete the following sentences by using the words between brackets :

(primary consumers – producers – secondary consumer)

1. In any food chain, plants are considered as
2. If a frog eats an insect that feeds on plants, this means that the frog is a
3. Humans can eat producers and

 Study the following food web, then choose the correct answer below :



1. When disappear from this food web, birds are moving away to search for food in another ecosystem.
 - a. butterflies only
 - b. worms only
 - c. grasshoppers only
 - d. primary consumers
2. Grasshoppers may die when there is no
 - a. birds.
 - b. snakes.
 - c. grasses.
 - d. butterflies.

LESSON

4

Activity 11 Food Web in the African Savanna

► Look at the opposite picture then put (✓) or (x) .

1. Food web is made up of several interconnected food chains. ()
2. Food webs can be used to show how organisms that live in an area depend on each other for survival. ()



- You have learned that food web is a model shows many different feeding relationships among living organisms.

Now You will design a model of a food web by using the following cards that show different types of living organisms.

► **Tools** Living organisms cards.



Rabbit



Snake



Mouse



Green plant



Eagle

► **Step 1**

Classify the animals in the pictures above according to the type of food that each animal eats.

► **Observation**

You will find that :

- The mouse and rabbit eat the green plant.
- The snake eats the mouse.
- The eagle eats the mouse, rabbit and snake.

► **Step 2**

Draw a food web using arrows to show the suitable food for each animal.

made up
several
area

تكون من
العديد من
منطقة

cards
classify
arrows

البطاقات
يصف
أسهم

مدرسي

► Observation

According to the previous steps, we can draw the food web as follows :



► Conclusion

Food web is a model that describes energy flow and feeding interactions between living organisms in an ecosystem.

💡 Note

If an organism in an ecosystem disappears, the food web in this ecosystem will be affected, because some organisms lose their food source.



Check your understanding

► Put (✓) or (x) according to the given food web.

1. Snake is considered as a producer. ()
2. Mouse can eat snake. ()
3. Green plant is a producer living organism. ()
4. Eagle is considered as a prey. ()

In the Assessment Book

Try to answer

Self-Assessment (10)

Exercises on Lesson 4

● Understand

● Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

1. To make a food web, you have to classify animals in an ecosystem according to their they get.
a. water b. light c. gases d. food
2. Which of the following food chains shows the correct way of energy flow through living organisms ?
a. Producer → predator → primary consumer.
b. Predator → producer → secondary consumer.
c. Producer → primary consumer → predator.
d. Producer → secondary consumer → predator.
3. The predator in a food web usually eats more than one type of
a. producers. b. consumers. c. decomposers. d. plants.
4. A snake is a predator for mice, while snake is considered as a prey for
a. rabbit. b. frog. c. eagle. d. deer.
5. Rabbits eat all the following types of food, except
a. grasses. b. carrots. c. seeds. d. insects.
6. If there is no primary consumers in an ecosystem, the producers will
a. increase. b. decrease. c. die. d. not be affected.

2 Put (✓) or (X) :

1. The number of secondary consumers will increase if the number of primary consumers decreases in an ecosystem. ()
2. It is difficult to make a food web if we don't know the type of food that each consumer eats. ()
3. In a food chain, the energy transfers from eagles to mice. ()
4. In an ecosystem that contains rabbits, mice, eagles and snakes only, if snakes disappear completely, so eagles will disappear completely. ()
5. The food web describes energy flow and feeding interactions between living organisms in an ecosystem. ()

Complete the following sentences using the words below :

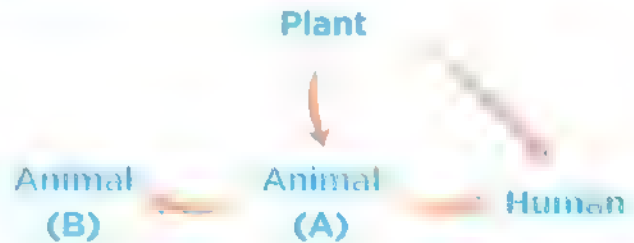
(primary consumers – food web – food)

1. We cannot make a food web, if we don't know the types of that the animals eat.
2. The interconnected food chains are known as
3. An eagle can eat rabbits and mice, which are considered as

Study the opposite food web, then choose the correct answer .

1. This food web starts with which are producers.

- a. human
- b. plant
- c. animal (A)
- d. animal (B)



2. Human can get energy from

- a. plant and animal (B).
- b. animal (A) only.
- c. plant only.
- d. plant and animal (A).

3. Energy cannot flow directly from the producer to

- a. human and animal (A).
- b. human and animal (B).
- c. animal (B) only.
- d. animal (A) only.

4. The living organism that gets energy directly and indirectly from the producer, is

- a. animal (A).
- b. animal (B).
- c. plant.
- d. human.

5. is considered as a primary and a secondary consumer at the same time.

- a. Plant
- b. Human
- c. Animal (A)
- d. Animal (B)

Study the Following figure, then choose the correct answer below :

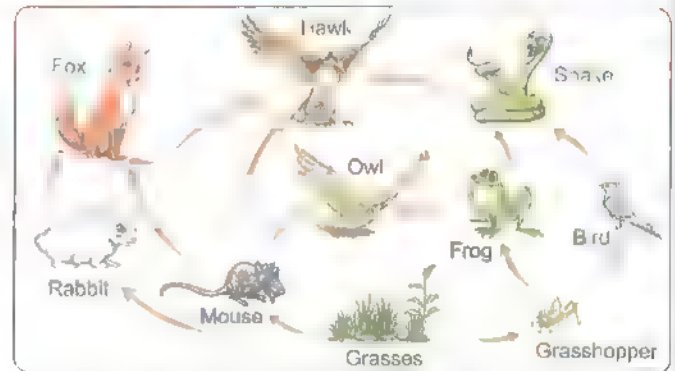


Which of the following, is necessary for survival of all living organisms ?

- a. Plant.
- b. The Sun.
- c. Grasshopper.
- d. Snake.

► Look at the opposite page (the picture) or (a) :

1. Food web is a model that shows many interactions among living organisms in an ecosystem. ()
2. Food webs show interactions among many food chains. ()



► Food webs show that different organisms in an ecosystem are connected to allow energy to pass between them to survive, where :

- Producers are eaten by some consumers.
- Some consumers are eaten by other consumers.
- Some consumers may eat the same producer or prey.

? Give a reason for :

It is better to use a food web to show interactions among living organisms than a food chain.

Because a food web shows interactions among many food chains so, the food web contains many organisms, while a food chain shows interactions between just few organisms.



Check your understanding

► Put (✓) or (x) :

1. Food webs show interactions between few organisms. ()
2. Food chains show interactions between many food webs. ()



Digital Extension Activity

Activity (13) "Decomposition" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 14 What Are Decomposers?

- The opposite pictures show examples of decomposers which are bread mold fungus and mushroom fungus.
- These decomposers make one of the most important processes on the Earth which is called "decomposition process".



Bread mold fungus



Mushroom fungus

How does decomposition process occur ?

- Decomposition process happens to all dead organisms as follows :

First	Second
<p>When animals and plants die, there are other animals called "scavengers" eat these dead organisms and break them down into smaller pieces.</p> <p>Scavengers :</p> <p>They are organisms that feed on the remains of dead animals and plants.</p> <p>Examples of scavengers :</p> <div style="display: flex; flex-wrap: wrap;"> <div style="text-align: center;">  Vultures </div> <div style="text-align: center;">  Hyenas </div> <div style="text-align: center;">  Crabs </div> <div style="text-align: center;">  Cockroaches </div> <div style="text-align: center;">  House flies </div> </div>	<p>Decomposers complete the process of decomposition by breaking down the smaller pieces of remains of dead plants and animals into nutrients that can be returned to the ecosystem so, plants can use these nutrients to make their own food.</p> <p>Examples of decomposers :</p> <div style="display: flex; flex-wrap: wrap;"> <div style="text-align: center;">  Snails </div> <div style="text-align: center;">  Slugs </div> <div style="text-align: center;">  Earthworms </div> <div style="text-align: center;">  Fungi </div> <div style="text-align: center;">  Bacteria </div> </div>

decomposition
nutrients
fungus
snails

التحلل
العناصر الغذائية
فطر
قواقع

bread mold
mushroom
scavengers
remains

عش الخيل
عيش الغراب
الكائنات الكائنة
بقايا

vultures
hyenas
slugs

نسور
ضباع
رخويات

Note

When nutrients consumed by plants, the cycle continues from producers (plants) to consumers then to decomposers again then back to the producers again.

Waste and dead organisms

Waste

- When you are finished using something like a food wrapper or a piece of paper you might throw it into a trash can.
- Trash is taken to landfills with all the other trash.
- Humans produce a lot of waste, so landfills take up more and more space.



How can humans reduce this waste ?

- There are only one way that people use to reduce these waste materials and trash known as "Recycling".
- In recycling process people use the waste materials and make new products instead of going into a landfill.



2 Dead organisms

- When organisms die, decomposers undergo decomposition process to release nutrients back into the environment so, they can be used again.

Example :

Remains of animals and plants are decomposed and become part of the soil, which is used by plants to make their own food.



Notes

1. Decomposition process is considered as nature's recycling factory.
2. Decomposition process takes place on land and also underwater.

waste
wrapper
throw
trash can

مخلفات
غلاف
يرمى
حاوية قمامة

landfill
reduce
recycling

مكب النفايات
خفض
إعادة التدوير

materials
undergo
release

مواد
تخضع
يسترحل
حرر ، يطلق



Check your understanding

► Put (✓) or (x) :

1. Scavengers are organisms that feed on the remains of other organisms. ()
2. Decomposers break down dead organisms into smaller pieces. ()
3. Hyenas and earthworms are examples of scavengers. ()
4. Decomposition process takes place on land and also underwater. ()



Digital Extension Activity

Activity 15 "Composting" in the school book is an optional digital activity.

You can do this activity by scanning its QR code found in your school book.

In the Assessment Book :

Try to answer :

Self-Assessment (11)

Exercises on Lesson 5

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- 1. Food web shows interactions between
 - a. few nonliving things.
 - b. many nonliving things.
 - c. few living organisms.
 - d. many living organisms.
2. In a food chain, there is a found between a producer and a secondary consumer.
 - a. decomposer
 - b. predator
 - c. primary consumer
 - d. tertiary consumer
3. The process which happens to all dead organisms is known as process.
 - a. photosynthesis
 - b. decomposition
 - c. breathing
 - d. digestion
- 4. In the decomposition process, the role of comes before the role of
 - a. scavengers decomposers.
 - b. decomposers – scavengers.
 - c. consumers – producers.
 - d. predators – producers.
5. All the following living organisms are decomposers, except
 - a. fungi.
 - b. bacteria.
 - c. slugs.
 - d. hyenas.
6. The nutrients that resulted from decomposition and returned to the ecosystem can be used directly by
 - a. consumers.
 - b. producers.
 - c. predators.
 - d. decomposers.
- 7. Decomposition process occurs to
 - a. dead animals and living plants.
 - b. living animals and dead plants.
 - c. dead animals and plants.
 - d. living animals and plants.

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Photosynthesis process	a. it is a process in which the blood carry oxygen to all body parts.
2. Decomposition process	b. it is a process in which the nutrients are returned to the ecosystem.
	c. it is a process through which producers can make their own food.

1. _____

2. _____

3 Put (✓) or (X) :

1. Food web shows interaction between many living organisms. ()
2. Nutrients that present in living organisms bodies returned to the ecosystem after death. ()
3. Both of bread mold fungus and house fly are decomposers. ()
4. Scavengers decompose dead plants and animals into nutrients that can be returned to the ecosystem. ()
- 5. Producers form their own food, while decomposers return nutrients back to the ecosystem. ()
- 6. At the beginning of decomposition process, decomposers break dead organisms down into smaller pieces. ()
7. Decomposers include mushroom fungus and slugs. ()
- 8. Recycling of waste materials reduces pollution and the size of landfills. ()
- 9. Both of bread mold and mushroom are two types of bacteria. ()

4 Write the scientific term of each of the following :

1. It is a process through which the nutrients found in dead organisms bodies return back to the ecosystem. (.....)
2. They are organisms that feed on dead organisms bodies and break them down into smaller pieces. (.....)
3. They are organisms that break down the remains of dead plants and animals into nutrients that return to the ecosystem. (.....)
4. It is a process through which humans can make new products from waste materials. (.....)

5 Complete the following sentences :

1. The interaction among many food chains is known as ..
2. Decomposition process done by two types of living organisms, which are organisms and organisms.
3. Nutrients that are resulted from decomposition process and returned back to the soil, can be consumed again by
4. Snails, earthworms and slugs are considered as ... , while vultures, crabs and cockroaches are considered as
5. Decomposition process takes place on land as well as under
- 6. Bread mold and mushroom are two types of
- 7. It is better to waste materials than throwing them in an ecosystem.

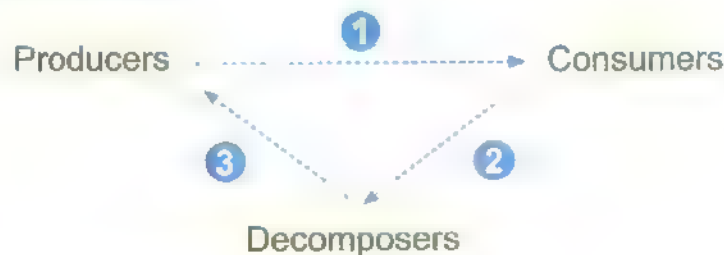
6 Give a reason for the following :

Scavengers must work on dead bodies before decomposers.

7 What happens if ... ?

There is no decomposition process done on the Earth.

8 Study the following figure that shows the cycle of nutrients in an ecosystem, then put (✓) or (X) below :



1. Number ① shows that nutrients transfer from producers to consumers. ()
2. Number ② shows that nutrients transfer from consumers when they die to decomposers. ()
3. Number ③ refers to nutrients are returned back to the soil where producers can use them again. ()
4. There is a similarity between human as a consumer and snail as a decomposer, where both of them can do a recycling process. ()
5. Photosynthesis process in producers is considered as nature's recycling factory. ()
6. In the previous figure, when producers die we can draw an arrow directed from producers to decomposers. ()

9 The following figure shows an energy flow through a food chain :

Producer → Animal (A) → Animal (B)

Which of the following is correct about this food chain ?

- a Animal (A) is a predator. b Animal (A) is a secondary consumer.
c Animal (B) is a tertiary consumer. d Animal (B) is a predator.

► In this concept, you have learned a lot about energy flow through an ecosystem, food chains and food webs.

Now try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in concept one.

Step 1 The Question

How does energy flow through an ecosystem ?

Step 2 My Claim

Step 3 My Evidence

Step 4 My Scientific Explanation

Activity 17 STEM ACTION

- Restoration ecology is very important for plants and animals that help them have a stable environment to survive.
- Plant ecologists are scientists who work on restoration projects and make experiments to provide data to make better restoration.
- In this activity, we will talk about Dr. Becky Barak who is a plant community ecologist.

Dr. Becky Barak

- She is a plant-community ecologist, where she studies groups of plants and she gets to do her research out on the prairie.
- She always loved plants and animals since here childhood, but she did not know that there was a science through which she can study plants and animals.
- When she was a teenager, she started to learn about ecology, then she studied a class in restoration ecology which means "rebuilding habitats that are damaged".



Seed Dispersal

★ Dr. Becky Barak has learned many interesting things such as :

- Different plants need different ways to transport (disperse) their seeds.
- There are plants with sticky seeds that stick to human clothes or an animal's body, so human or animal can carry these seeds to another place where seeds fall down.
- Other plants have light seeds that are dispersed by wind, these seeds fly away to new habitats to grow in other places.

Careers in ecology

- If you are interested in the natural world, you can share in conservation or restoration work in your area to help take care of plants and animals.
- Your interest in nature now could lead to a career in ecology later in life.



Check your understanding

► Put (✓) or (x) :

1. Dr. Becky Barak does her research in the lab. ()
2. Different plants need different ways to transport their seeds. ()

restoration ecology
ecologist
plant community
ecology

علم الترميم البيئي
عالم البيئة
مجمع النبات
علم البيئة

research
prairie
teenager
habitats

بحث
البراري
مراصفة
بيئات
disperse
sticky
light
careers

يبحث / ينشر
لرج
خفيفة
وظائف

Activity 18**Review: Energy Flow in Ecosystems**

► We can summarize this concept in the following main points:

Ecosystem :

It is an area (or community) that contains living organisms and non-living things that interact with each other.

- An ecosystem is a community that provides food, water and shelter to all living organisms live in it.
- Energy flows through an ecosystem from plants to animals and between animals when they eat each other, then when living organisms die, their energy is returned to the soil.
- We need energy to do all activities in our daily life such as thinking, breathing and moving.
- The primary source of energy is the Sun for all organisms on the Earth to live, grow and carry out life processes.
- The light energy of the Sun (radiant energy) is converted into chemical energy in plants and then this energy is passed to animals and humans so, the main source of energy for all living organisms comes from the Sun.

- All living organisms eat food to get the energy they need to survive.
- Living organisms can be classified into three groups according to their way of feeding, which are :

- (1) **Producers** : They are organisms that can make their own food and don't consume other plants or animals.
- (2) **Consumers** : They are organisms that eat other living organisms to get their energy, because they cannot make their own food.
- (3) **Decomposers** : They are organisms that carry out the process of decomposition by breaking down or decaying dead organisms.

- The movement of energy and nutrients through an ecosystem can be represented using a model known as a food chain.

Food chain :

It is a model that shows one linear set of feeding relationships and movement of energy between living organisms.

Example : Grass $\xrightarrow[\text{by}]{\text{eaten}}$ Mouse $\xrightarrow[\text{by}]{\text{eaten}}$ Snake $\xrightarrow[\text{by}]{\text{eaten}}$ Hawk.

- The energy from the Sun passes to the grass, then to the mouse and snake then finally to the hawk.
- Grass can make its own food using the sunlight, while animals like mouse, snake and hawk cannot.
- Any animal that is hunted and eaten by another animal is called "Prey".
- Any consumer that hunts and eats another animal is called "Predator".

Food web :

It is a model that shows many different feeding relationships among living organisms.

- The ways in which many food chains interact within an ecosystem form a food web.
- It is better to use a food web to show interactions among living organisms than a food chain, because a food web shows interactions among many food chains so, the food web contains many organisms, while a food chain shows interactions between just few organisms.
- Decomposers are organisms which make one of the most important processes on the Earth which is called "decomposition process".
- Decomposition process happens to all dead organisms as follows :

First	Second
<ul style="list-style-type: none"> • When animals and plants die, there are other animals called "scavengers" eat these dead organisms and break them down into smaller pieces. 	<ul style="list-style-type: none"> • Decomposers complete the process of decomposition by breaking down the smaller pieces of remains of dead plants and animals into nutrients that can be returned to the ecosystem so, plants can use these nutrients to make their own food.

- There are only one way that people use to reduce these waste materials and trash known as "Recycling".
- In recycling process people use the waste materials and make new products instead of going into a landfill.

In the Assessment Book :

Try to answer :

- Self-Assessment (12)
- Model Exam on Concepts (11) & (12)

Exercises on Lesson 6

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- 1. Restoration ecology means
 - a. damaging the rebuilt habitats.
 - b. rebuilding habitats that are damaged.
 - c. throwing plastic products in seas.
 - d. throwing plastic products in deserts.
- 2. Restoration ecology helps animals to
 - a. move away to another ecosystem.
 - b. adapte to damaged ecosystem.
 - c. decrease their number.
 - d. increase their number.
- 3. All the following ways help plants to disperse their seeds, except
 - a. water. b. air. c. animal bodies. d. sunlight.
- 4. Plants with sticky seeds need ... to stick to disperse and grow in a new habitat.
 - a. air b. water
 - c. light energy from the Sun d. body of a living organism.
- 5. Wind play an important role in dispersing . seeds.
 - a. small light b. big heavy c. sticky d. floating

Put (✓) or (X) :

- 1. People and engineers must share scientists in restoration ecology. ()
- 2. Restoration ecology negatively affects human health. ()
- 3. Restoration projects must include restoring of shelters, food and water resources. ()
- 4. All plants need the same way to disperse their seeds. ()
- 5. Both of small light seeds and big heavy seeds can disperse by wind. ()

Write the scientific term of each of the following :

- 1. They are scientists who work on restoration projects to have a stable environment for plants to survive. (.....)
- 2. Organisms that use human clothes or animal bodies or even wind to disperse their seeds to new habitats. (.....)
- 3. The suitable ecosystem for plant-community ecologists to do their researches. (.....)

Model Exam on Concept (1-2)

Total mark

20

(A) Choose the correct answer :

(5 marks)

- Hawk eats a rabbit to get energy, this means that
 - hawk and rabbit are predators.
 - the hawk is a predator.
 - the hawk is a prey.
 - the rabbit is a predator.
- Photosynthesis process produces ...
 - glucose sugar in the producers.
 - glucose sugar in the consumers.
 - water in decomposers.
 - water in consumers.
- All types of plants are similar in all the following characters, except
 - they are eaten by primary consumers.
 - they are able to make photosynthesis process.
 - they live in different types of ecosystems.
 - they can feed on predators.
- If there are no predators in an ecosystem, the other consumers will
 - not be affected.
 - die.
 - increase.
 - decrease

(B) What happens if ...?

There is no decomposition process done on the Earth.

(A) Put (✓) or (X) :

- All plants need the same way to disperse their seeds. ()
- Dead organisms don't need energy. ()
- The first link in any food chain is a consumer. ()
- Hawks, crocodiles and sharks are considered as predators. ()

(B) Give reasons for :

- Desert ecosystem contains few members of primary consumers.

2. Scavengers must work on dead bodies before decomposers.

(A) Complete the following sentences :

1. Decomposition process takes place on land as well as under
2. Plants produce and during photosynthesis process.
3. In a food chain, the energy flows from consumer to a secondary consumer.
4. Bread mould and mushroom are two types of

(B) The following figure shows an energy flow through a food chain :

Producer → **Animal (A)** → **Animal (B)**

Which of the following is correct about this food chain ?

- a Animal (A) is a predator. b Animal (A) is a secondary consumer.
c Animal (B) is a tertiary consumer. d Animal (B) is a predator.

(A) Write the scientific term of each of the following :

1. It is the primary source of energy for all living organisms on the Earth. (.....)
2. It is a process through which humans can make new products from waste materials. (.....)
3. The animal that is eaten by another animal. (.....)
4. It is a model that shows one linear set of feeding relationships and energy flow between living organisms. (.....)

(B) Complete the following sentences by using the words between brackets :

(primary consumers – producers – secondary consumer)

1. In any food chain, plants are considered as
2. If a frog eats an insect that feeds on plants, this means that the frog is a
3. Humans can eat producers and

Concept

1.3

Changes in Food Webs





Learning outcomes

By the end of this concept, your child will be able to :

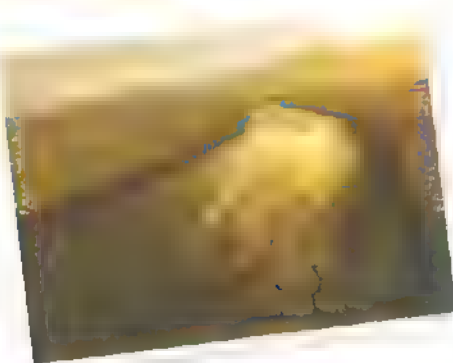
- Demonstrate through modeling how changes in an ecosystem can disrupt a food web.
- Construct an explanation about how human activity can negatively impact an ecosystem.
- Argue for possible solutions to environmental problems that can restore the health of an ecosystem.

Key vocabulary

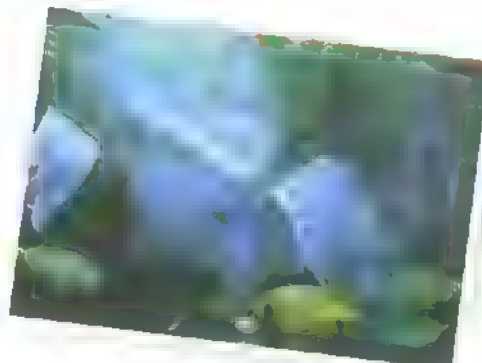
- Climate
- Conservation
- Nursery
- Habitat
- Microorganisms
- Restoration
- Microplastics
- Pollution
- Population

Notes For Parents On Concept (1.3)

Lessons	Activities	What you should do with your child
1	Activity 1	Discuss with your child what might happen to a food web when an organism or the environment changes within an ecosystem.
	Activity 2	Explain to your child how we can protect the marine environment in Palau island
	Activity 3	Explain to your child how the change in ecosystem affects the food web.
	Activity 4	Let your child think about an ecosystem in his/her area and draw its food web
2	Activity 5	Discuss with your child how the energy transfers from the prey to the predator.
	Activity 6	Discuss with your child the flow of energy in the desert food web.
3	Activity 7	Explain to your child how does pollution affect the food web.
	Activity 8	Explain to your child how a population of one species affects the population of other species.
4	Activity 9	Explain to your child why healthy habitats are important to all organisms in the food web.
	Activity 10	Explain to your child the effect of plastic products on marine life.
5	Activity 11	Discuss with your child why coral reef is an important component of many marine food webs.
6	Activity 12	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 13	Explain to your child how scientists, engineers and citizens work on habitat restoration.
	Activity 14	Let your child review the main points in this concept.



Picture (1)



Picture (2)

► What do you notice in the previous pictures ?

• In picture (1), we notice that :

- The dried ground around the lake is due to the drought conditions.
- Evaporating water from the lake is due to the hot of the Sun.

• In picture (2), we notice that :

- The sea is polluted due to throwing of plastic garbage of some ships into the sea.

• Ecosystems and food webs can be affected by many factors such as :

- Climate changes.
- Pollution.
- Human activities.



Note

Pollution : It is the harms that happen to air, water or soil by substances that can harm living organisms.

► What might happen to a food web when an organism or the environment changes within an ecosystem ?

All organisms may be affected, where :

- If plants (producers) were disappeared from an ecosystem, the consumers will need to move to other places to search for food or they will die.
- If the number of one species of consumers in an ecosystem increases, the resources of food and shelter may disappear, so they will die.

► In this concept, we will study :

- Protecting ecosystems.
- Population changes.
- Habitat loss.
- Plastic pollution.
- Habitat restoration.

dried ground
food web
plastic garbage
substances

الأرض الجافة
شبكة غذائية
مخلفات بلاستيكية
مواد

ecosystem
evaporating water
population
habitat loss

نظام بيئي
تبخر المياه
مجموعات من الكائنات الحية
فقدان الموطن الطبيعي

drought conditions
climate changes
human activities
habitat restoration

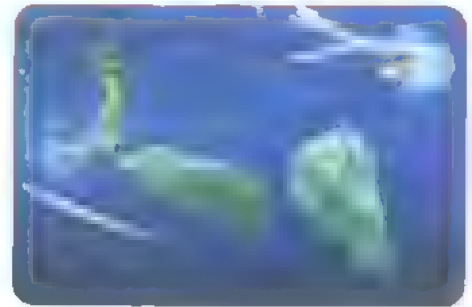
ظروف الجفاف
تغيرات مناخية
أنشطة الإنسان
إصلاح الموطن الطبيعي

Activity 2 Protecting Ecosystems

► Look at the following pictures, then put (✓) or (x) :



Overfishing affects the life of marine organisms. ()



Throwing plastic in seas affects the life of marine organisms. ()

► Human activities affect the marine habitats through :

- **Overfishing** (when humans catch many fish from rivers, seas and oceans).
- **Water pollution** (when humans throw waste materials in rivers, seas and oceans).

Protection the marine environment in Palau Island

- On any island, we can observe that what is happening on land affects what is happening in the marine environment.
- People in Palau uses different conservation programs to protect the marine environment and its resources by creating well-designed protected marine environment, where :
 - People in Palau control the human activities on land to keep the protected marine environment from pollution by avoid throwing waste materials in ocean.
 - Fishers must not overfishing the coral reefs to conserve the marine environment.



Palau island



Check your understanding

► Put (✓) or (x) :

1. Water pollution cannot affect the marine habitats. ()
2. People in Palau must control the human activities on land to protect the marine habitat from pollution. ()

protecting ecosystem حماية الأنظمة البيئية resources
marine environment بيئة بحرية create
coral reefs الشعاب المرجانية

مصادر overfishing لصيد الجائر
يُخلق conservation programs برامج الحفاظ

Activity


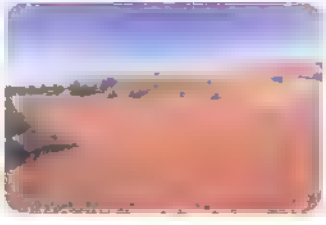

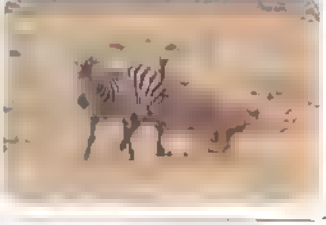
3

What Do You Already Know About How Food Webs Can Change ?

► When an ecosystem changes, food webs change too, where :

- Relationships between organisms in an ecosystem play an important role in keeping this ecosystem balanced.
- When organisms are removed or their role in an ecosystem changes, this ecosystem could be destroyed (collapsed) and also food webs would change.

How does ecosystem change affect food webs ?

What would happen if ... ?	Result		
There is a gentle rain in the desert	The desert ecosystem may be improved .	Because rainwater will feed the plants (producers) which will feed the organisms.	
There is a heavy rain in the desert	The desert ecosystem may be harmful .	Because the water of heavy rain will cause flooding which will destroy the ecosystem.	
There is a drought and all the grass dies	The food web in the ecosystem may be destroyed .	Because the plants will die and also the organisms will die.	
There are many top predators in the food web	The other organisms in the food web may be harmful .	Because the top predators will eat all the organisms.	

Note

Top predators : They are predators (consumers) that exist at the top of food chains such as : Tigers, lions, sharks, crocodiles, etc. ...

relationships
gentle rain
heavy rain
exist

علاقات
أمطار خفيفة
أمطار غزيرة
توجد
collapse
remove
flood

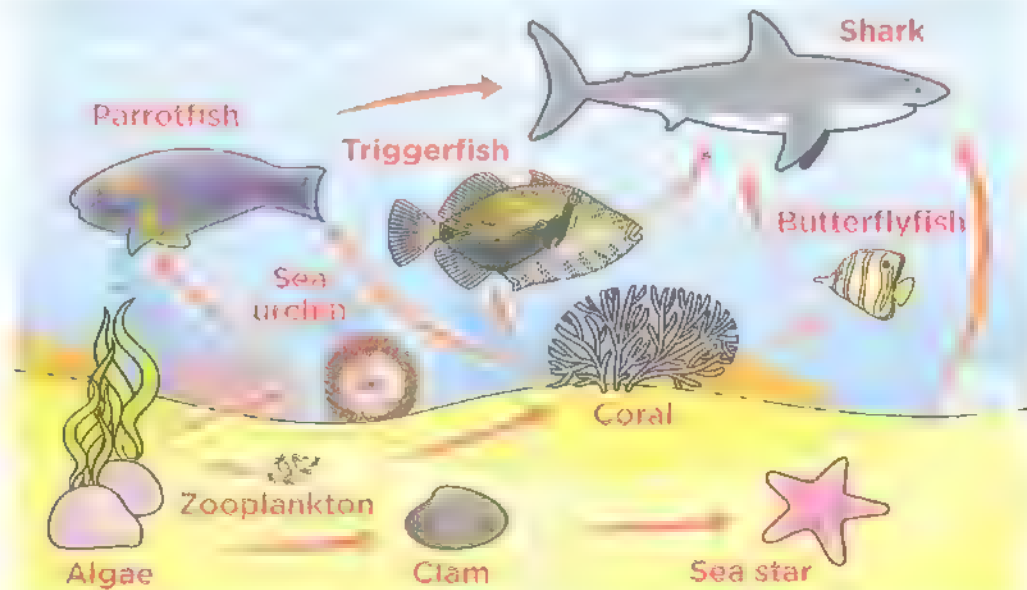
أنهار / تحطم
يزيل
فيضان
balance
improve
top predators

توازن
يحسن
الحيوانات المفترسة

Food web

* You have known from the previous concept that the food web is a model shows different feeding relationships among living organisms.

► Look at this marine food web, then observe which organisms eat other organisms.



► From the previous marine food web, we observe that :

Algae produce their own food

The zooplankton, clam and sea urchin feed on the algae

- The sea star feeds on the clam.
- Coral feeds on the zooplankton

The shark feeds on the sea star and the three different fish.

- Butterflyfish and triggerfish feed on coral.
- Parrotfish feeds on coral and sea urchin.



Check your understanding

► Choose :

- When there is a gentle rain in the desert, the desert ecosystem may be
a. harmed. b. destroyed. c. improved. d. polluted.
- Algae are considered
a. consumers. b. producers. c. decomposers. d. dead creatures.

algae
triggerfish
clam

طحالب
سمكة الزناد
الأصداف البحرية

parrotfish
zooplankton
feed on

السماكة البيفاعة
العوالق البحرية
يتغذى على

sea urchin
butterflyfish

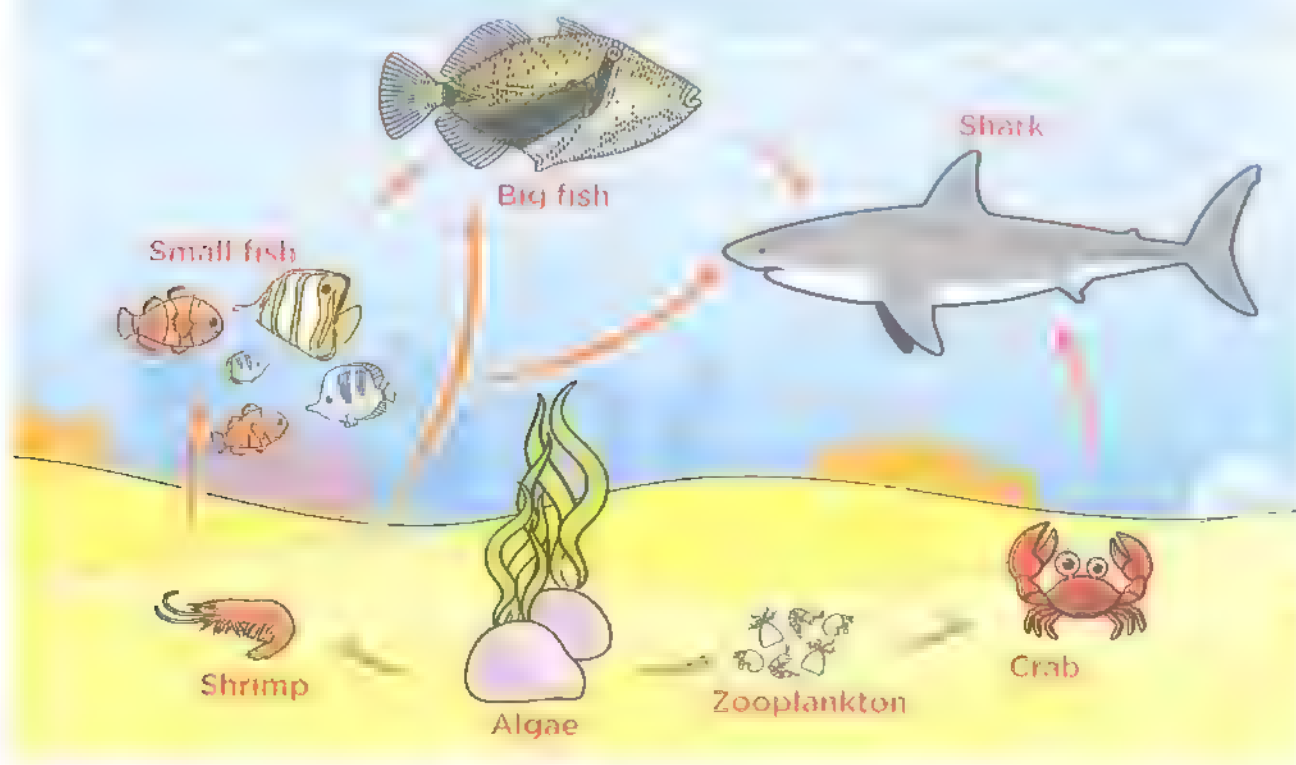
قبيضة البحر
سمكة الفراشة

Activity 4

My Environment

► Look at the following marine food web, then complete the diagram below using these words :

(zooplankton – crab – algae – shark – shrimp)



The
produce their
own food.

The
and the
shrimp feed
on the algae.

- The feeds
on the zooplankton.
- The small fish and
big fish feed on
the

The
feeds on crab,
small fish and
big fish.

In the Assessment Book :

Try to answer .

Self-Assessment (13)

Exercises on Lesson 1

● Understand

● Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

- 1. The Sun provides the Earth with
 - a. light only.
 - b. warm only.
 - c. light and warm.
 - d. light and sound.
- 2. On extreme hot climate, the water of a lake
 - a. increases due to evaporation.
 - b. decreases due to evaporation.
 - c. changes into ice.
 - d. has a lower temperature.
- 3. All the following factors pollute the water, except
 - a. sunlight.
 - b. animals wastes.
 - c. human wastes.
 - d. plastic garbage.
- 4. All the following are affected by water pollution, except
 - a. the soil.
 - b. the Sun.
 - c. the animals.
 - d. the plants.
- 5. If the amount of grasses increases in an ecosystem, this directly increases the number of
 - a. caracals.
 - b. hawks.
 - c. rabbits.
 - d. lions.
- 6. When the number of , the amount of grasses in an ecosystem increases.
 - a. producers decreases
 - b. decomposers decreases
 - c. primary consumers increases
 - d. secondary consumers increases
- 7. Overfishing and throwing plastic garbage in the sea affect the survival of directly.
 - a. desert organisms
 - b. marine organisms
 - c. rainforest organisms
 - d. rodents
- 8. All the following are human activities that affect a marine ecosystem, except
 - a. flooding.
 - b. throwing human wastes.
 - c. overfishing.
 - d. throwing plastic garbage.
- 9. When there is a gentle rain in a desert ecosystem, this ecosystem may be
 - a. harmed.
 - b. improved.
 - c. destroyed.
 - d. collapsed.
- 10. All the following are top predators, except
 - a. hawks.
 - b. tigers.
 - c. butterflyfish.
 - d. lions.
- 11. The marine food web usually started with
 - a. clam.
 - b. algae.
 - c. zooplankton.
 - d. parrotfish.

12. If clam are completely removed from a marine ecosystem, the survival of _____ may be affected.
- a. triggerfish b. sharks c. sea urchin d. sea stars

 Choose from column (B) what suits it in column (A).

(A)	(B)
1. There is a heavy rain in a desert.	a. this ecosystem may be improved due to melting of snow, where plant resources and animals shelters appear again.
2. There is a gentle rain in a rainforest.	b. this ecosystem may be harmed due to the decrease of the amount of rain, where plant resources and animals shelters may be affected.
	c. this ecosystem may be destroyed due to flooding, where plant resources and animals shelters removed away.

1.

2.

 Put (✓) or (X) :

1. If producers were removed from an ecosystem, the consumers will need to move away. ()
2. Overfishing is one of the climate changes that affects the marine ecosystem. ()
3. What is happening on land doesn't affect what is happening in marine ecosystem. ()
- 4. It is better to recycle the waste materials than throwing them in rivers and seas. ()
- 5. Food webs don't change if their surrounding environments get changed. ()
6. If we introduce a new predator to an ecosystem, this ecosystem will be affected. ()
7. If there is a heavy rain in a desert ecosystem, it will be harmed. ()
8. Zooplankton can make their own food by photosynthesis process. ()
9. In a marine food web, there are many top predators like sea star and sea urchin. ()
10. Top predators are decomposers that present at the top of food chains. ()
11. Ecosystem can be effected by climate changes, pollution and human activities. ()

Write the scientific term of each of the following :

1. It is the harms that happen to air, water and soil due to human activities. (.....)
2. A human activity that leads to decreasing the number of fish and affecting many marine food webs. (.....)
3. They are consumers that exist at the top of food chains. (.....)

Complete the following sentences :

1. Throwing plastic garbage and waste materials into a river cause water
2. If producers increase in an ecosystem, the number of primary consumers will
3. The human activity that doesn't pollute water but decreases the number of marine organisms is known as
4. Heavy rain causes which destroys desert ecosystems.
5. The consumers that exist at the top of any food chain are called

Give reasons for :

1. When the number of one species of consumers in an ecosystem increases, they will die.
.....
.....
2. Death of algae may leads to moving sharks away to another places.
.....
.....


What happens if ... ?

1. Throwing big amounts of plastic garbage and waste materials in water.
.....
.....
2. A small lake is exposed to extreme hot climate for several months.
.....
.....
3. The number of secondary consumers in an ecosystem decreases.
.....
.....

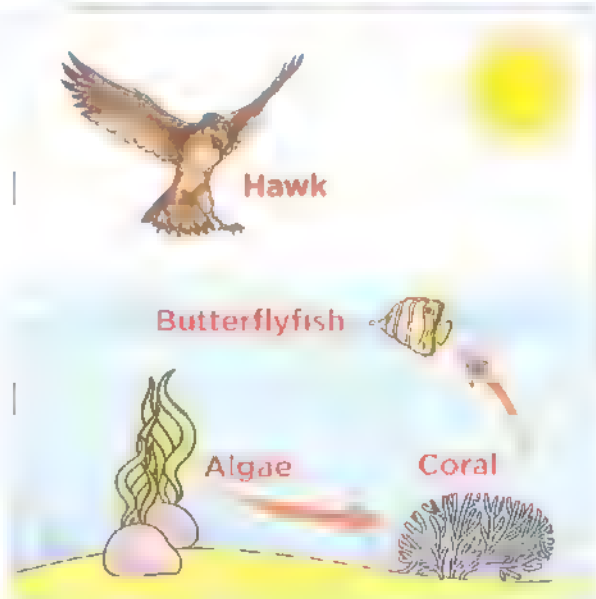
 Study the following food chain in an ecosystem, then complete the table below



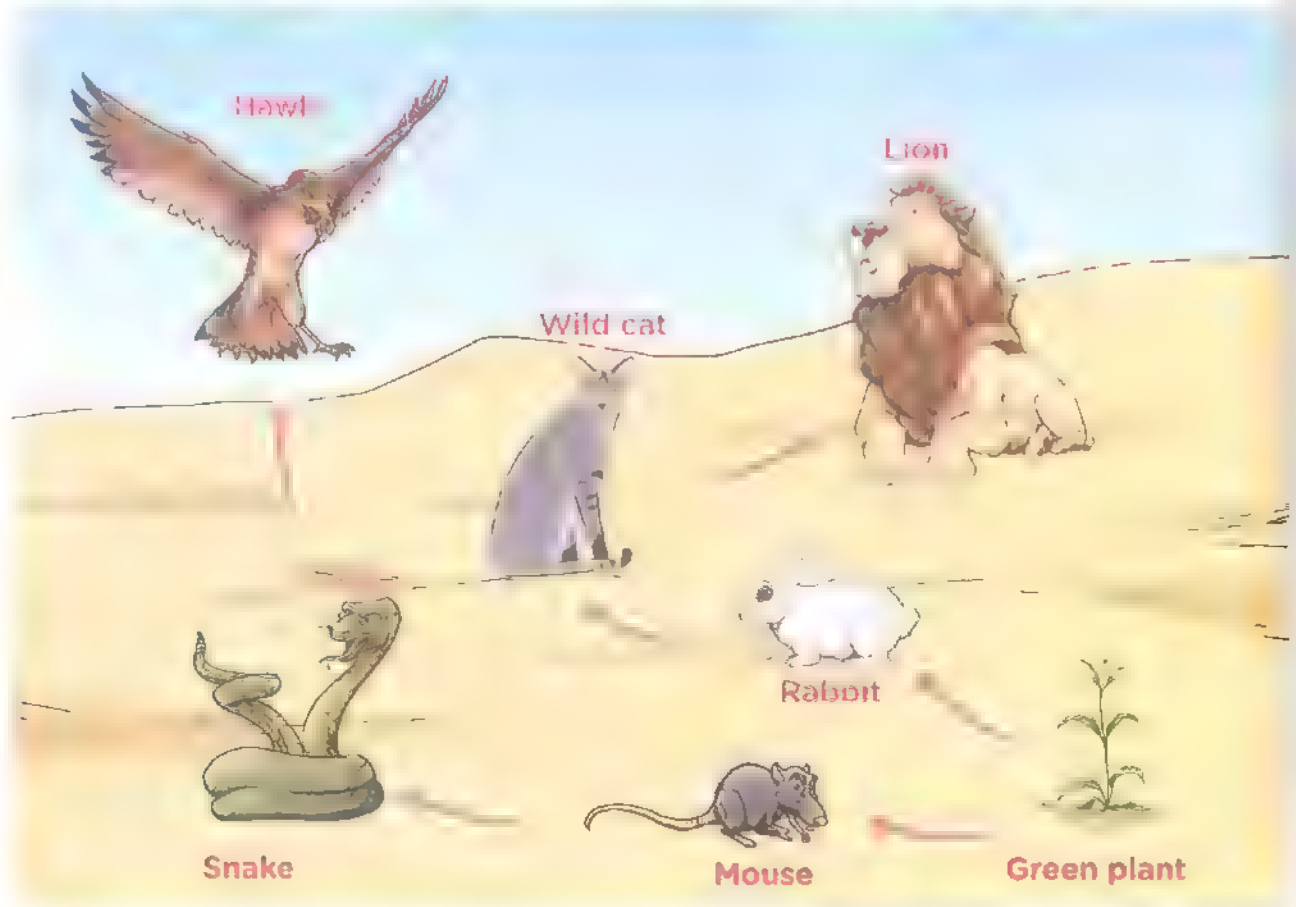
Situations	Results
1. The number of rabbits increases	the amount of decreases, while the number of increases.
2. The amount of grasses and the number of foxes	the number of rabbits increases.
3. All disappear or their role change in this food chain.	all foxes are move away to another ecosystem to search for food.
4. The ecosystem of this food chain is affected by severe drought conditions.	all die, because there is no water to make their own food.

 "What is happening on land affects what is happening in the marine environment" According to the previous fact, study the following figure then complete the sentences below :

- 1. The living organism that can make photosynthesis process is
- 2. Energy can flow from marine environment to land, when the hawk eats
- 3. If many sharks are present in this ecosystem, will moved to another ecosystem to search for food.



► Look at the following food web, then complete the sentences below :



1. The represent the producers.
2. The and represent primary consumers.
3. The and represent secondary consumers.
4. The and represent tertiary consumers.

► You have known from the previous concept that the Sun produces energy that the plants take, then this energy transfers to consumers that when they die, the decomposers convert them into simple substances and return the energy back to the soil.

• **Now**, we are going to do an activity to make a model that shows the flow of energy through a food web.

primary consumers كائنات المستهلكة الأولية

convert يحول

flow of energy تدفق الطاقة

secondary consumers كائنات المستهلكة الثانوية

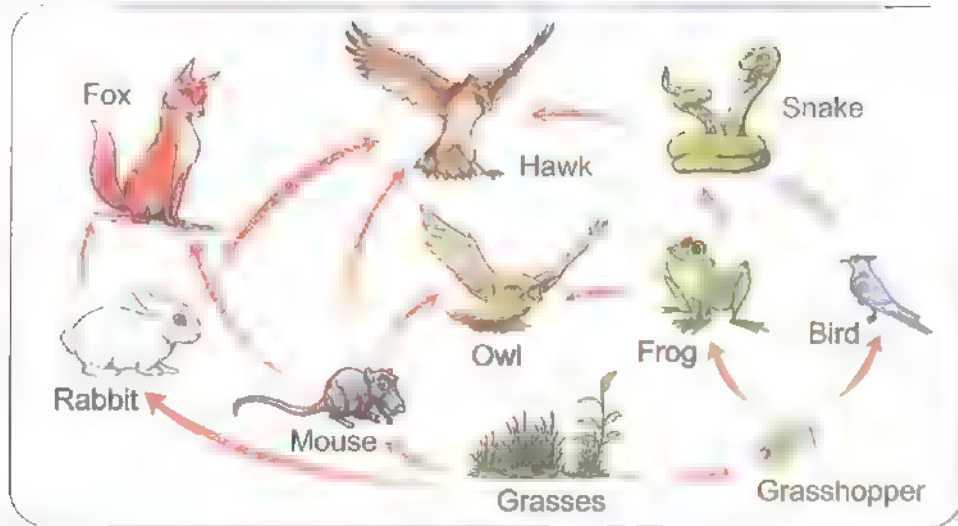
wild cat القط البري

tertiary consumers كائنات المستهلكة الثالثية

simple substances مواد بسيطة

Tools

- A picture of a food web.



- Cards labeled with organisms.

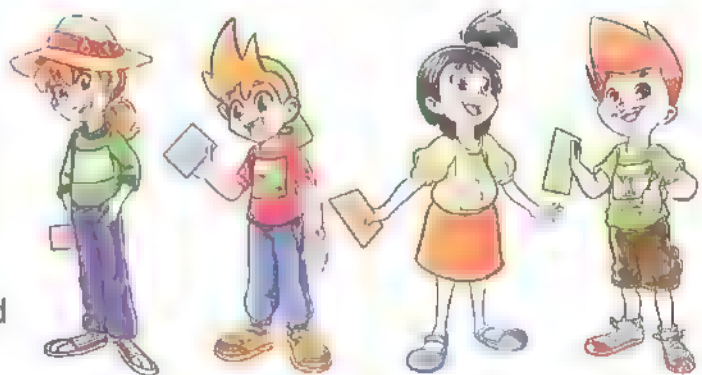


- Paper squares (represent the flow of energy in an ecosystem).

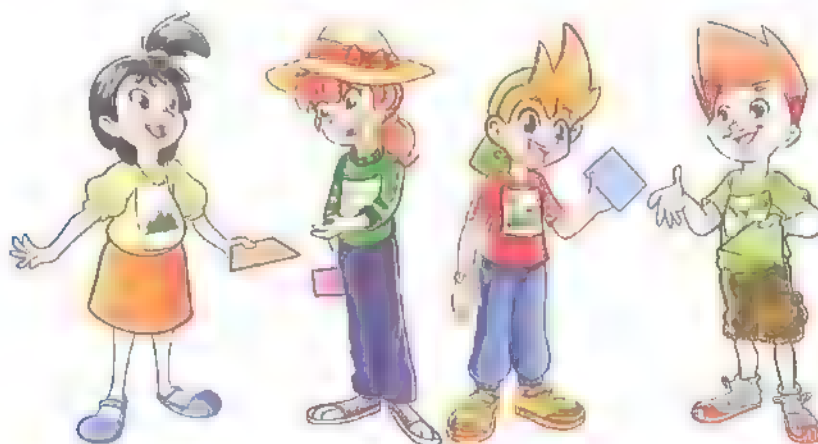


Steps

1. Choose some of your friends to play with them a game of predator-prey tag.
2. Observe the picture of the food web carefully with your friends.
3. Give each one of your friends a card labeled with an organism from the above food web and a paper square.



4. Start the game with your friends. If one of your friends becomes a prey to another friend which is a predator, so the prey gives his paper square to the predator.



► Observation

When a predator feeds on a prey, it gains energy, so the energy transfers from the prey to the predator.

► Conclusion

The energy in the overall system remains as the same, where :

- 10 % only of this energy transfers between living organisms when an organism feeds on the other.
- 90 % of this energy is left to the decomposers which return this energy back to the soil.



Check your understanding

► Put (✓) or (x) :

1. In a food web, the energy transfers when a prey gains energy from the predator. ()
2. 90 % of the energy in a food web transfers between living organisms when an organism feeds on the other. ()

Activity

6

Desert Food Web

- Look at this desert food web, then use the table below to draw the arrows that show the flow of energy through this food web :



Number of arrows	Direction of arrows
↑↑ (2 blue arrows)	Comes out of grass
↑ (1 green arrow)	Goes to the snake
↑↑↑ (3 red arrows)	Goes to the fox
↑↑↑ (3 black arrows)	Goes to the eagle

? What would happen ...

1. To the rabbits (hares) if all the grass were removed from the previous food web.
Rabbits would not find any type of food, therefore they would die.
2. To the eagles if all the grass were removed from the previous food web.
At first, the eagles would not be affected but when the rabbits die, the eagles would have less food.



Check your understanding

- According to the previous food web, complete this sentence using these words :

(energy - rabbits - grass - eagles)

Rabbits feed on (consume) the _____, so the energy travels to the _____, then the eagles feed on the rabbits and the _____ travels to the _____.

desert food web
arrows
eagle

شبكة غذائية صحراوية
أسهم
نسر

direction
hare

اتجاه
أرنبية

In the Assessment Book :

Try to answer
Self-Assessment (14)

Exercises on Lesson 2

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. If there is a tertiary consumer in a food chain, this means that there is
 - a. a primary consumer only.
 - b. a secondary consumer only.
 - c. a primary and a secondary consumers.
 - d. neither primary nor secondary consumers.
2. Decomposers play an important role in returning the energy back to all the following, except
 - a. the air.
 - b. the soil.
 - c. the water.
 - d. the decomposer.
3. The secondary consumer is considered as
 - a. a prey for primary and tertiary consumers.
 - b. a predator for primary and tertiary consumers.
 - c. a prey for primary consumer.
 - d. a prey for tertiary consumer.
4. In a food chain, the energy transfer
 - a. from a predator to a prey.
 - b. from a prey to a predator.
 - c. from a predator to a producer.
 - d. from a consumer to a producer.
5. The amount of energy that transfers between living organisms in a food web, is
 - a. 10 %
 - b. 90 %
 - c. 30 %
 - d. 100 %
6. If all grasses were removed completely from an ecosystem, rabbits in this ecosystem will
 - a. increase.
 - b. decrease.
 - c. die.
 - d. not be affected.
7. It is better for a predator in a food web, to have
 - a. only one type of decomposers.
 - b. more than one type of decomposers.
 - c. only one type of prey.
 - d. more than one type of prey.

Put (✓) or (X) :

1. Most of living organisms are prey for some animals and also predators for others at the same time. ()
2. The Sun produces energy that decomposers use to make their food. ()
3. The soil fertility depends on decomposers. ()

- 4. Any food chain can be formed of producers only. ()
- 5. Energy transfers when a prey loses energy to the predator which feeds on it. ()
- 6. A desert food chain doesn't contain any type of fish or sharks. ()

 Write the scientific term of each of the following :

- 1. They are consumers which feed on secondary consumers. (.....)
- 2. They are living organisms that include bacteria and fungi, which return energy back to the soil. (.....)
- 3. It transfers between animals in a food web, to help them do their activities and survive. (.....)

 Complete the following sentences :

- 1. Predators of living organisms may be for other living organisms.
- 2. Secondary consumers feed on consumers.
- 1. All energy in all living organisms return back to the environment by the help of organisms.
- 1. A predator get from the prey which feeds on.

 Study the following figures, then put (✓) or (X) .

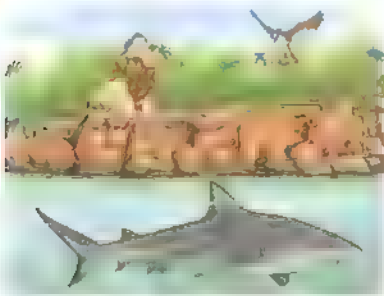


Figure (A)



Figure (B)

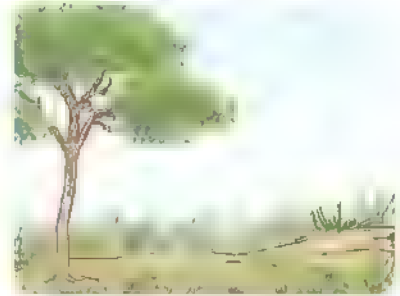


Figure (C)

- 1. All living organisms in figures (A) and (B) can make their own food by photosynthesis process. ()
- 2. Some marine organisms are present in figure (B). ()
- 3. Top predators are found only in figure (A). ()
- 4. All animals in figure (A) can find a prey in figure (B), except shark. ()
- 5. To form a food chain, you have to rearrange the previous figures as follows :
Figure (C) then Figure (B) then Figure (A). ()

LESSON

3

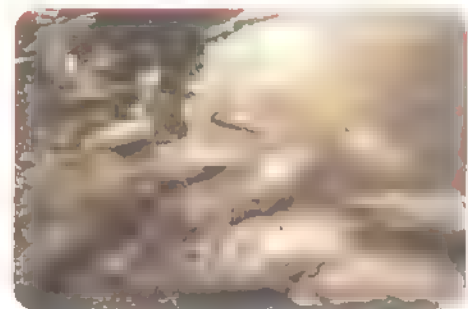
Activity 7

Energy Flow Daily Model Part (2) : Pollution

► Look at the following pictures, then put (✓) or (x)



- 1 Living organisms in forests are not affected by burning of forests. ()



- 2 Marine organisms are negatively affected by leakage of oil into the water. ()

Does pollution affect the food webs ?

Pollution affects the food webs when food resources and habitats of living organisms in these food webs are polluted which may lead to the death of these organisms.

► Imagine that there is a fire in a forest, you will notice the following things :

- Smoke and ash are spread all over the forest and cover the grasses.
- Animals may have difficulty breathing.

So, pollution affects a food web, where if an animal is exposed to pollution and dies, it affects all other levels of the food web.



Check your understanding

► Put (✓) or (x) :

1. Food webs, food resources and habitats of living organisms are negatively affected by pollution. ()
2. Smoke and ash are not negatively affect plants and animals. ()
3. Fire in forests produce smoke that causes difficulty breathing for animals. ()

forests
smoke
spread

غابات
دخان
ينتشر
marine organisms
ash
levels

كائنات بحرية
رماد
مستويات
leakage
difficulty breathing

تسرب
صعوبة في التنفس

Activity 8**Population Changes**

► There are many factors affect the ecosystem such as :

- Increasing or decreasing the amount of water.
- Increasing or decreasing the temperature.
- Climate change.

► These factors cause problems for many living organisms, where :

- If the climate change is suitable, the population of a species increases but if it is unsuitable, the population of a species decreases, so organisms would either die or move to another place.

Population :

It is the number of organisms of one type of species living in an area.

- In an ecosystem, all species depend on other species for survival, so an increase or decrease in one species affect the population of other species causing a **population change**.

► Now, let's study an example shows how a population of one species affects the population of other species.

Seabirds

- They build their nests on the top of mountain cliffs.
- They dive deep down into the sea to feed on small fish which are the main source of food for many seabirds.
- The small fish feed on **microorganisms** that float on the surface of the sea.



Seabird

Microorganisms

- They are organisms that are too small for people to see with only their eyes.
- They can make their own food, so they are the producers in the marine food web.
- They are found in cold water habitats, because they need this water to survive.



Microorganisms

- What will happen to microorganisms if the climate is changed and the water become warm ?

Microorganisms will move toward an area where the water is cooler

Then, the small fish that feed on these microorganisms will also move to a new habitat

Therefore, when seabirds will not have a food source, some of them will move to a new habitat, while others will die.



Check your understanding

- Complete the following sentences using these words :

(microorganisms – population – cold – seabirds)

1. The _____ feed on the small fish which feed on _____ that float on the surface of the sea.
2. The number of organisms of one type of species living in an area is known as _____.
3. Microorganisms are found in _____ water habitats.

In the Assessment Book :

Try to answer

Self-Assessment (15)

Exercises on Lesson 3

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. Leakage of oil into seawater negatively affects the _____.
 - a. desert organisms.
 - b. marine organisms.
 - c. forest organisms.
 - d. rivers organisms.
2. Fire in forest produces
 - a. smoke only.
 - b. ash only.
 - c. smoke and ash.
 - d. oxygen and ash.
3. Pollutants produced from a forest fire harm all the following, except
 - a. air.
 - b. respiratory system.
 - c. grasses.
 - d. sunlight.
4. As a result of pollution in an ecosystem, the number of living organisms _____.
 - a decreases.
 - b increases.
 - c doesn't change.
 - d is doubled.
5. Any increase or decrease in the number of organisms of one type of species is known as
 - a. an ecosystem.
 - b. adaptation.
 - c. a climate change.
 - d. a population change.
6. If the climate change is suitable, the population of a species _____.
 - a. will die.
 - b. will not be affected.
 - c. will increase.
 - d. will decrease.
7. Seabirds build their nests
 - a on the water surface.
 - b on the top of mountain cliffs.
 - c deep down into the sea.
 - d deep down into the river.
8. All the following statments are correct, except ...
 - a small fish can eat seabirds.
 - b sharks can eat small fish.
 - c small fish cannot eat seabirds.
 - d seabirds cannot eat sharks.
9. The suitable habitat for microorganisms to survive is _____.
 - a hot water.
 - b warm water.
 - c cold water.
 - d boiled water.

Put (✓) or (X) :

1. Forest fire negatively affects the marine organisms. ()
2. Pollution affects both of food resources and animal habitats. ()
3. Forest fire produces smoke only that covers the grasses. ()

4. Death of an animal due to pollution affects all other levels of the food web. ()
5. If the climate change is unsuitable, the population of a species decreases. ()
6. In an ecosystem, all species depend on other species for survival. ()
7. Seabirds eat small fish that swim near the water surface. ()
8. Microorganisms are producers that small fish feed on to get energy. ()

5 Write the scientific term of each of the following :

1. It is the number of organisms of one type of species live in an area. (.....)
2. Any increase or decrease in the number of organisms. (.....)
3. Flying living organisms that build their nests on the top of mountain cliffs and dive deeply into the sea to eat. (.....)
4. They are organisms that are too small for people to see with only their eyes. (.....)

6 Complete the following sentences using these words :

(microorganisms – smoke – oil – increase – forests – populations)

1. Fire of and leakage of cause pollution that affects the survival of living organisms.
2. When food resources and animal habitats are affected by pollution, many are negatively affected also.
3. Forest fire produces that causes difficulty breathing for animals.
4. If the climate change is suitable, the population of a species will ..
5. Small fish feed on ... that float on the surface of the sea.

7 Give reasons for :

1. Food webs can be destroyed due to pollution.

.....

2. In case of fire forest, animals suffer from difficulty breathing.

.....

8 What happens if ... ?

1. The climate change is unsuitable for a population of one type of species.

.....

2. The seawater becomes warm.

.....

Study the following two diagrams, then put (✓) or (X) .

Microorganisms → Small fish → Seabirds

Diagram (A)

Algae → Small fish → Seabirds
 Small fish → Sharks

Diagram (B)

1. Both diagrams (A) and (B) show two food webs. ()
2. In diagram (B), both of seabirds and sharks are secondary consumers. ()
3. In diagram (A), if small fish are removed, the seabirds are negatively affected. ()
4. There is a food relationship between seabirds and sharks, where each of them can eat the other. ()
5. In diagram (B) if sharks are removed, the seabirds population may be decreased. ()

► Look at the following figures, then complete .



Figure (1)

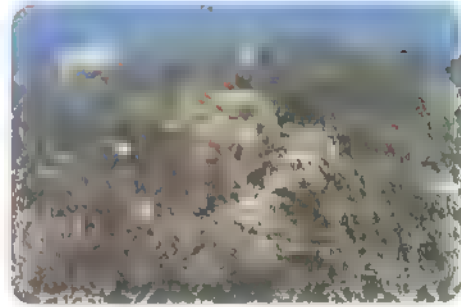


Figure (2)

1. Figure _____ represents dead coral reefs due to rising of water temperature.
2. Figure _____ represents healthy coral reefs.

► Why are healthy habitats important to all organisms in a food web ?

- Because they provide organisms with resources that they need to survive as air, food, water and shelter, so if each species gets its needs to survive, there will always be enough food for each organism in the food web.
- When these habitats are destroyed, different organisms may not be able to survive and this will negatively affect the flow of energy in the food web.

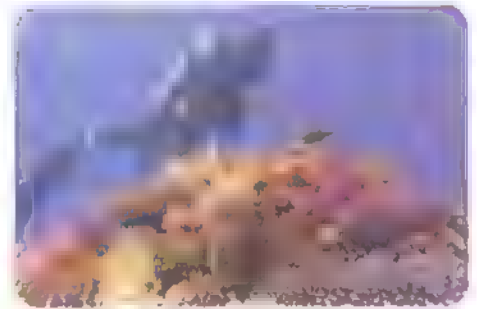
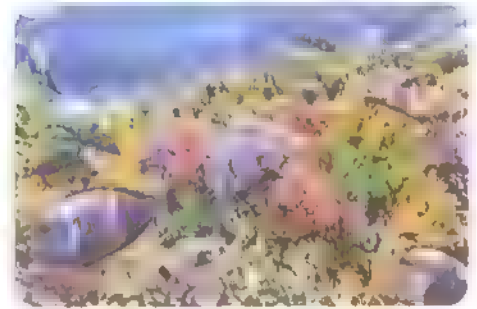
Notes

1. From human activities that change the habitats in an ecosystem are
 - building up more buildings and roads.
 - Throwing waste materials in water.
 - overfishing in seas and oceans.
2. Human activities can also impact the weather and nonliving factors in an ecosystem, such as the temperature of ocean water.
3. All of these changes can cause habitat loss which is one of the main causes of extinction.

► Now, we will study an example of habitat loss in a coral reef system.

Coral reefs

- They are some of the most diverse and valuable ecosystems on Earth.
- They provide food and shelter for large numbers of fish and other marine organisms.
- They are important for tourism, where people travel to coral reefs for fishing or diving. This help increase the visitors and income of local hotels, restaurants and other business.



Coral bleaching

Coral reefs bleaching happens when the water temperature rises, where :

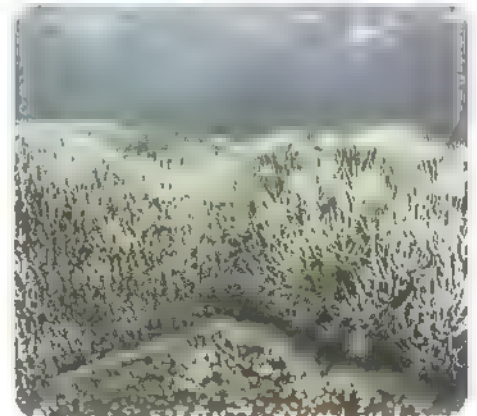
When the water is very warm, coral reefs will get rid of the algae living in their tissues.



This causes the coral reefs turn completely into white.



As a result of coral reefs bleaching, they often do not survive.



Coral bleaching

Impact of coral bleaching

Destroying of coral reefs due to coral bleaching as a result of rising of water temperature has negative effects on many communities as :

• Coral and fish communities :

Fish and other marine organisms that depend on coral reefs for food and shelter may die or move to another habitat.

• Human communities :

People that depend on coral reefs and fish for food will be negatively affected.

diverse
income
business
coral reefs bleaching

تنوع
دخل / إيراد
شركات
ابيضاض الشعاب المرجانية

valuable
visitors
get rid of
communities

ذو قيمة
الزائرين
يتخلص من
مجموعات

tourism
local hotels
issues
negative effects

تسليحة
قنادق المحبة
أشجار
أثار سلبية



Check your understanding

► Put (✓) or (x) :

1. Coral reefs bleaching happens when the temperature of seawater decreases. ()
2. Coral reefs bleaching negatively affects the coral, fish and human communities. ()
3. From human activities that change the habitats in an ecosystem is overfishing in seas. ()
4. Habitat loss is not considered from causes of extinction. ()

Activity 10 Plastic Pollution

- You have learned from the previous lessons that human activities may negatively affect (impact) the environment as the impact of throwing plastics in the marine environments (as seas).
- Where, seas are habitats for a large number of organisms, these organisms don't find anything to feed on except plastic waste thrown in seas.
- When the amount of plastic increases in the sea, the number of marine organisms decreases, so marine food webs will be affected, leading to a breakdown in the flow of energy.



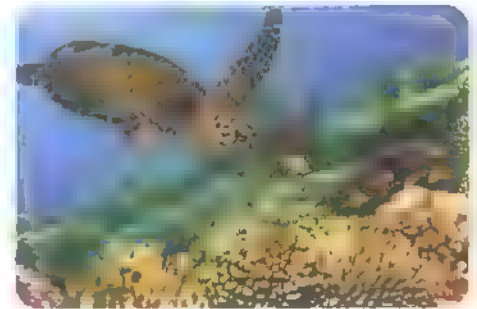
The effect of plastic products on marine life

Plastics in the sea affect marine life, where whales, sea turtles, seabirds and fish cannot often differentiate between real food and plastic.

Examples :

How do sea turtles get harmed by feeding on plastic ?

- Sea turtles cannot differentiate between a jellyfish and a piece of plastic in the water.
- Therefore, sea turtles eat a lot of plastic thinking that it is jellyfish, so sea turtles get harmed.



How do coral reefs get harmed by feeding on plastic ?

- Due to the effect of UV rays coming from sunlight, plastic products get broken down into smaller pieces called **microplastics** (smaller than a grain of rice).
- When coral reefs filter the seawater to get their food, they ingest these microplastics that are as small as the pieces of food that coral reefs get from the water, so coral reefs get harmed.



breakdown

plastic products

ingest

تكسر / انهيار

المنتجات البلاستيكية

يبتلع

differentiate

microplastics

grain of rice

بشرق

الجسيمات البلاستيكية

حبة الأرز

piece

filter

قطعة

يُصفى / يُرشح

Notes

1. About 8 million tons of plastic are thrown into the marine environment every year, most of them come from land.
2. Plastics are very harmful to marine organisms because they are toxic and sharp.
3. People can recycle the plastic products instead of throwing them in the sea.



Check your understanding

- Complete the following sentence using these words :

(UV – Sun – products – microplastics)

Plastic get broken down into smaller pieces called due to the effect of rays coming from the

- Put (✓) or (x) :

1. When the amount of plastic increases in the sea, the number of marine organisms increases. ()
2. Plastics are very harmful to marine organisms as they are toxic and sharp. ()

In the Assessment Book :

Try to answer

Self-Assessment (16)

Exercises on Lesson 4

● Understand

● Apply

● Analyze

● Evaluate

● Create



Choose the correct answer :

1. Healthy marine environment is important for survival of
a. humans. b. lions. c. fish. d. deers.
2. All the following are healthy resources for marine food webs, except
a. clean water and food. b. clean food and shelter.
c. clean shelter and water. d. polluted water, food and shelter.
3. When the marine habitats are destroyed, the number of living organisms in their food webs is
a. increased. b. decreased. c. not changed. d. doubled.
4. All the following may occur due to habitat loss, except
a. increasing of population. b. decreasing of population.
c. extinction of some organisms. d. decreasing of resources.
5. Coral reefs are considered as
a. living organisms. b. bacteria.
c. ecosystems. d. fungi.
6. When water temperature increases, algae leave tissues of _____, so they become bleached.
a. seabirds b. coral reefs c. clam d. sharks
7. As a result of coral reefs bleaching, they will be
a. increased. b. enlarged. c. survived. d. died.
8. Plastic waste materials cause all the following to the marine environment, except
a. breakdown in food webs. b. pollution of water.
c. increasing of population. d. decreasing of population.
9. Both of sea turtles and are present in the same marine food chain.
a. deers b. jellyfish c. eagles d. tigers
10. When coral reefs _____ the seawater, they may ingest microplastics.
a. evaporate b. filter c. cool d. warm
11. Coral reefs are negatively affected by
a. rising water temperature only.
b. ingesting microplastics only.
c. Both of rising temperature and ingesting microplastics.
d. neither rising of temperature nor ingesting microplastics.

Put (✓) or (X) :

1. Healthy habitats provide living organisms with clean air, healthy food and water. ()
2. The flow of energy in food webs is not affected when the natural habitats are destroyed. ()
- 3. Human activities impact the nonliving things in an ecosystem. ()
- 4. Healthy coral reefs have no benefit to fish but they are important for tourism. ()
- 5. When the temperature of seawater decreases, coral reefs receive more algae. ()
- 6. Coral bleaching occurs as a result of throwing plastic in seawater. ()
- 7. Living organisms in seas and oceans cannot differentiate between real food and plastic waste materials. ()
8. Jellyfish can get its energy by eating the sea turtle. ()
- 9. UV rays coming from the Sun, break down plastic wastes into microplastics. ()
10. Coral reefs filter the seawater to get their needed food. ()

Write the scientific term of each of the following :

1. It is a condition in which coral reefs turn completely into white. (.....)
- 2. They are rays coming from the Sun that break down plastic products into microplastics. (.....)
3. Small pieces of plastics in the size of rice grains and they cause harms to marine organisms. (.....)
- 4. It is a process that people can do for plastic waste materials instead of throwing them in seas and oceans. (.....)

Complete the following sentences using these words

(extinction – overfishing – shelter – toxic – predator)

1. Healthy natural resources include clean air, healthy food, water and suitable
2. The human activity that directly decreases the marine population is
3. Habitat loss is not only decrease marine population but also it is one of the main causes of
4. When a sea turtle eats a jellyfish, this means that the sea turtle is a living organism.

5. Plastic waste materials are very harmful to marine organisms, because they are and sharp.

5 Give reasons for :

1. Coral reefs are important for human communities.
.....
.....
2. Coral bleaching happens when the water temperature rises.
.....
.....
3. Both of rising water temperature and ingesting microplastics are harmful for coral reefs.
.....
.....

Study the following figures, then put (✓) or (X) :



Plastic products
in water



Sea turtle



Jellyfish

1. We can draw arrows between plastic products, jellyfish and sea turtle to design a food chain. ()
2. The sea turtle can differentiate between plastic and jellyfish. ()
3. Both of jellyfish and sea turtle are consumers. ()

LESSON 5

Activity 11 Impact on a Food Web

► Look at the opposite picture then put () or (x)

1. Coral reefs are considered important habitats for many marine organisms. ()
2. Coral reefs bleaching negatively affects the fish communities. ()

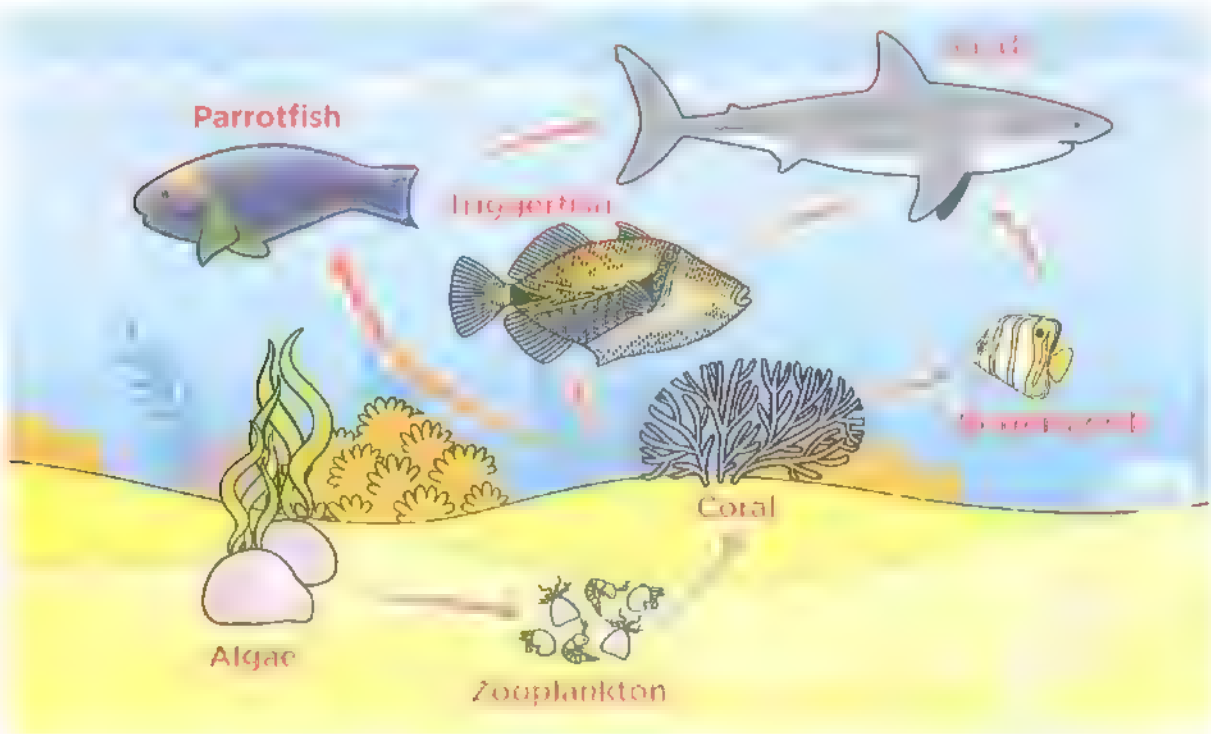


► Coral is an important component of many marine food webs, where it is considered as :

- Food for a variety of primary consumers.
- Shelter for many organisms in the sea.

So, the loss of coral due to extreme weather or pollution leads to destroying the marine ecosystem.

► Look at the following marine food web, then observe what would happen to this food web if the coral reef disappear ?



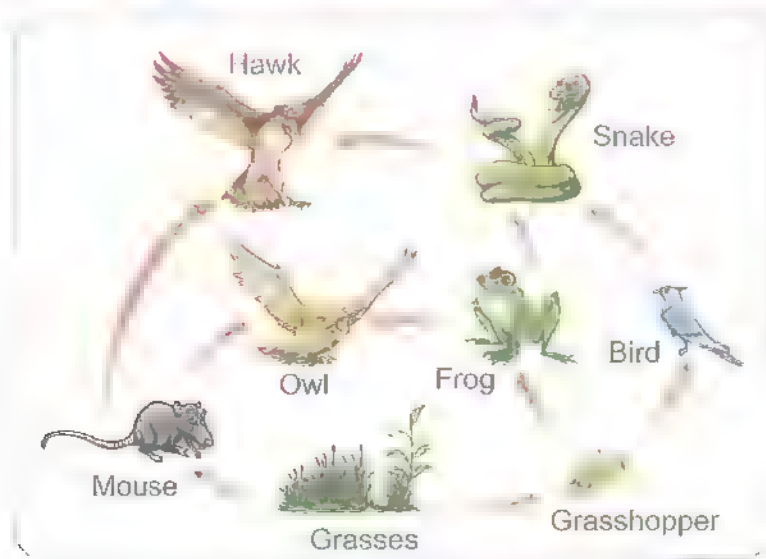
► If the coral reefs disappeared :

- Organisms that depend on coral for food and shelter will die.
- The parrotfish, triggerfish and butterflyfish will have nothing to eat, so they will die.
- The shark will find a small amount of food to eat, so it also may die
- The algae that live in the coral tissues will lose their habitats.



Check your understanding

- Look at the following food web, then answer the question below .



In your opinion, what would happen if the grasses die ?

.....

.....

.....

In the Assessment Book

Try to answer

Self Assessment (17)

Exercises on Lesson 5

● Understand

● Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

- 1. Coral reefs are considered as resources of
 - a. food only.
 - b. shelter only.
 - c. food and shelter.
 - d. food and pollution.
- 2. Algae in coral reefs provide food for directly.
 - a. primary consumers
 - b. secondary consumers
 - c. producers
 - d. top predators
- 3. Coral reefs bleaching negatively affects directly.
 - a. parrotfish only
 - b. triggerfish only
 - c. butterflyfish and shark
 - d. parrotfish and triggerfish
- 4. All marine living organisms in seas and oceans form
 - a. many food webs.
 - b. one food chain only.
 - c. two separated food chains only.
 - d. three separated food chains only.
- 5. are living organisms that are negatively affected by pollution of marine ecosystem.
 - a. Whales and lions
 - b. Sharks and tigers
 - c. Elephants and deers
 - d. Algae and fish
- 6. Which of the following two living organisms don't have direct food relationship between them ?
 - a. Parrotfish and shark.
 - b. Butterflyfish and shark.
 - c. Triggerfish and shark.
 - d. Eagle and shark.

2 Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Coral reefs	a. they are marine top predators.
2. Triggerfish	b. they are producers in the marine ecosystem.
3. Algae	c. they are prey for sharks.
	d. they are food resources for parrotfish.

1.

2.

3.

 Put (✓) or (X) :

1. The polluted water has a positive effect on coral reefs. ()
- 2. If coral reefs are destroyed, many marine food chains will be destroyed. ()
- 3. Primary consumers and predators in seas and oceans are negatively affected by rising water temperature. ()
- 4. Coral reefs depend on butterflyfish for food and shelter. ()
- 5. Coral reefs are considered as a suitable habitat for sharks. ()

 Study the following food chain, then choose the correct answer below :



If the number of snakes increases suddenly,

- a the number of frogs increases and the number of hawks decreases.
- b the number of frogs decreases and the number of grasshopper increases.
- c the number of hawks decreases and the amount of grass increases.
- d the number of grasshopper increases and the number of hawks decreases.

LESSON

6

Activity 12

Applied Evidence Like A Scientist

► In this concept, you have learned about changes in food webs.

Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in concept one.

Step 1 The Question

What might happen to a food web when an organism or the environment changes within an ecosystem ?

Step 2 My Claim

Step 3 My Evidence

Step 4 My Scientific Explanation

Activity 13 Habitat Restoration

- You have learned from the previous lessons that environmental changes and human activities may negatively impact ecosystems.
- But, there are ways through which we can restore the habitat leading to a healthy and balanced ecosystem.
- Restoration projects allow scientists to find out better solutions for reducing the negative impacts of human activities.
- Human activities can cause big changes to the environment such as :

When many plants are removed, riverbanks erode, so floods may reach farther areas when wetlands are drained.



- Once harm occurs to the environment, scientists, engineers and citizens work on "Habitat restoration"

Habitat restoration :

It is the process of returning a habitat (an environment) back to its natural state before harm was done.

The importance of habitat restoration projects

Habitat restoration projects try to repair all parts of the habitat, where they help prevent species from extinction by restoring the habitat (including the resources of food, water and shelter) to the way it was before its damage.

Note

Most of habitat restoration projects require a lot of work and take a long time, but they can have very positive results.

Rebuilding coral reefs

One example of restoring a habitat is "a coral reef rehabilitation project" that happens in the Arabian Gulf, where :

- Scientists collect small parts of different coral species and then move them to a "nursery".



environmental changes التغيرات البيئية
erode تآكل
repair إصلاح
rehabilitation project مشروع إعادة تأهيل

projects مشاريع
wetlands الأراضي الرطبة
prevent يمنع
Arabian Gulf الخليج العربي

riverbanks ضفاف النهر
citizens مواطنين
rebuilding إصلاح / إعادة بناء
nursery المشتل

ضفاف النهر
مواطنيين
إصلاح / إعادة بناء
المشتل

- **Nursery** is an area in the sea, where scientists take care of small pieces of coral until they grow up and can be moved back to the reefs where they were dying.
- The healthy coral reefs can continue growing and reproducing to make new coral reefs again.

Protecting coral reefs from plastic pollution

- The world-famous coral reefs of the Red Sea are home to many marine organisms.
- In Egypt, coastal communities near the coral reefs applied a new way of life known as a "**zero plastics**", where people in these communities :
 - Replace plastic forks with wooden ones.
 - Replace plastic bags with cloth ones.



? What happens if ...

A habitat is not restored.

Many species in this habitat may be lost, because they don't have their needs to survive.



Check your understanding

► Put (✓) or (x) :

1. Human activities can't cause changes in the environment. ()
2. Habitat restoration means returning a habitat back to its natural state before harm was done. ()
3. People should not throw plastic waste into the sea. ()

Activity 14 Review: Changes in Food Webs

▶ We can summarize this concept in the following main points :

- Ecosystems and food webs are negatively affected by :
 - **Climate changes.**
 - **Pollution.**
 - **Human activities.**
- Human activities affect the marine habitats through :
 - **Overfishing.**
 - **Water pollution.**
- When an ecosystem changes, food webs change too.
- Relationships between organisms in an ecosystem play an important role in keeping this ecosystem balanced.
- When organisms are removed or their role in an ecosystem changes, this ecosystem could be destroyed.

Population :

It is the number of organisms of one type of species living in an area.

- In an ecosystem, all species depend on other species for survival, so an increase or decrease in one species affect the population of other species causing a **population change**.
 - **Seabirds** feed on small fish which feed on **microorganisms** that float on the surface of the sea.
 - Microorganisms can make their own food and they are found in cold water habitats.
-
- Healthy habitats are important to all organisms in a food web, because they provide organisms with resources that they need to survive as : air, food, water and shelter.
 - When habitats are destroyed, different organisms may not be able to survive and this will negatively affect the flow of energy in the food web.
 - **Coral reefs** provide food and shelter for large numbers of fish and other marine organisms and also they are important for tourism, so the loss of coral due to extreme weather or pollution leads to destroying the marine ecosystem.
 - **Coral reefs bleaching** happens when the temperature of water rises.

- Destroying of coral reefs due to coral bleaching has negative effects on fish, coral and human communities.
- When the amount of plastic increases in the sea, the number of marine organisms decreases, so marine food webs will be affected leading to a breakdown in the flow of energy.

Habitat restoration :

It is the process of returning a habitat back to its natural state before harm was done.

- **Nursery** is an area in the sea, where scientists take care of small pieces of coral until they grow up and can be moved back to the reefs where they were dying.
- **People should :**
 - recycle the plastic products instead of throwing them in the sea.
 - replace the plastic forks with wooden ones.
 - replace the plastic bags with cloth ones.

In the Assessment Book :

Try to answer :

- Self-Assessment (18)
- Model Exam on Theme (1)

oral

ms

1

4. Citizens must share in returning a habitat back to its healthy condition before harm was done. ()
5. Nursery is the natural habitat in the sea, in which coral reefs continue growing and reproducing. ()
6. People near the coastal areas must replace plastic bags with cloth one. ()

Write the scientific term of each of the following :

1. They are projects in which scientists, engineers and citizens try to repair all parts of a habitat. (.....)
2. It is an area in the sea, where scientists take care of small pieces of coral until they grow up. (.....)
3. A process of returning a habitat back to its natural state before harm was done. (.....)

Complete the following paragraph using these words :

(dying – grow up – bleaching – nursery)

We can protect coral reefs from by transferring coral into in the sea, where scientists take care of coral until they and then moved back to the reefs to continue growing where they were

Give reasons for :

1. It is better to keep natural resources healthy than applying restoration projects.
.....
2. When we remove plants from riverbanks, the floods become more dangerous.
.....

Study the following two figures, then put (✓) or (X) :

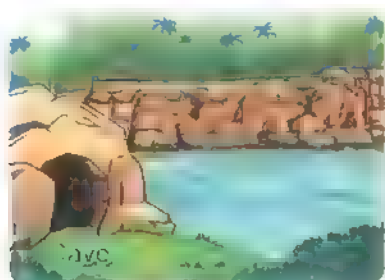


Figure (A)



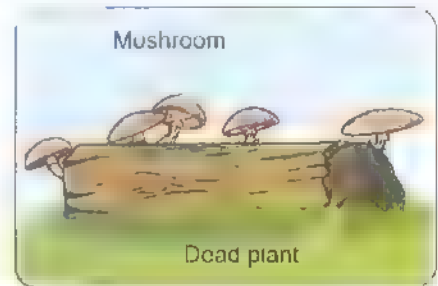
Figure (B)

1. Rabbits can grow and reproduce in healthy natural resources that present in figure (B). ()
2. Figure (A) includes healthy resources of food, water and shelter for seabirds. ()
3. Habitat restoration projects can be applied on figure (B) only, where figure (A) contains healthy natural resources. ()
4. We can use figure (B) as a nursery for corals until they grow up. ()

Study the opposite figure, then choose the correct answer :

This figure shows ..

- a. energy transfers from mushrooms to dead plant.
- b. energy transfers from dead plant to mushrooms.
- c. oxygen gas transfers from air to dead plant for breathing process.
- d. carbon dioxide gas transfers from air to dead plant for photosynthesis process.



Choose what happens if we cut down a large number of trees in a forest ?

	Carbon dioxide gas in air	Riverbanks	Flooding
a.	decreases	erode	increases
b.	decreases	increase	decreases
c.	increases	erode	increases
d.	increases	increase	decreases

Model Exam on Concept (1-3)

Total mark

20

(A) Choose the correct answer :

1. All the following factors pollute the water, except
a. plastic garbage. b. sunlight.
c. animals wastes. d. humans wastes.
2. In a food chain, the energy transfers
a from a consumer to a producer. b from a predator to a producer.
c from a predator to a prey. d from a prey to a predator.
3. Seabirds build their nests
a. on the water surface. b. deep down into the sea.
c on the top of mountain cliffs. d deep down into the river.
4. As a result of coral reefs bleaching, coral will be
a. increased. b. enlarged. c. survived. d. died.

(B) What happens if ... ?

The number of secondary consumers in an ecosystem decreases.

.....
.....

(A) Put (✓) or (X) :

(5 marks)

1. Coral reefs eat butterflyfish to get energy. ()
2. People near the coastal areas must replace plastic bags with cloth ones. ()
3. Ecosystem can be negatively affected by climate changes, pollution and human activities. ()

(B) Give reasons for :

1. In case of forest fire, animals suffer from difficulty breathing.

.....
.....

2. Coral bleaching happens when the water temperature rises.

.....
.....

 (A) Complete the following sentence using these words :

(marine environment - ecosystem - shelter)

Coral reefs are considered as an that supply food and for many living organisms which live in

(B) Form a food chain by using the following living organisms :

(Lion – Grasses – Deer)

 (A) Write the scientific term of each of the following :

1. It is an area in the sea, where scientists take care of small pieces of coral until they grow up. (.....)
2. Small pieces of plastics in the size of rice grains and they cause harms to the coral reefs. (.....)
3. It is the number of organisms of one type of species living in an area. (.....)

(B) Correct the underlined words :

1. Due to rising of water temperature, coral reefs turn completely into green. (.....)
2. Producers need the energy of moonlight to make photosynthesis process. (.....)

Theme Two Matter and Energy

UNIT

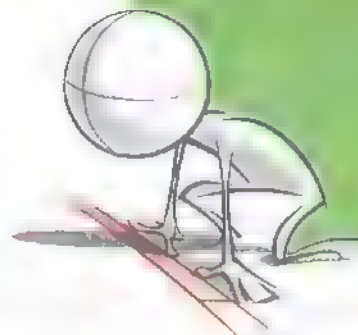
2

Particles in
Motion



Get Started

What I Already Know



- In the previous years, you have learned that **matter** can be found in three states which are solids, liquids and gases.



Picture (1)



Picture (2)



Picture (3)

- When observing the pictures above that show different volcanoes, you can find the three states of matter, where :

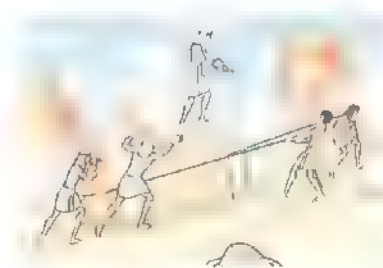
- Picture (1) shows gases comes out of a volcano.
- Picture (2) shows lava which is a liquid state of matter that comes out during a volcanic eruption.
- Picture (3) shows volcanic rocks which are solid state of matter. These rocks are formed when lava cools down.

- In this unit, you are going to study :

- Matter is composed of very small particles.
- The properties of particles of solids, liquids and gases.
- How to identify, describe and measure matter.
- Physical changes and chemical changes of matter.

- **Unit Project : "Slippery Sand":**

At the end of this unit, you will make a research project about how the ancient Egyptians mixed sand with water to move the large heavy blocks stones across the desert sand to build the pyramids.



Concept

2.1

Matter in the World Around Us





Learning outcomes

By the end of this concept, your child will be able to :

- Communicate the defining characteristics of the three states of matter.
- Explain how changes in states of matter result in changes to the movement of the particles within matter.
- Develop models of particles of matter in different states.

Key vocabulary

- | | |
|-------------------|------------|
| • Gas | • Liquid |
| • Mass | • Material |
| • Matter | • Model |
| • Particle | • Property |
| • Solid | |
| • State of matter | |

Notes For Parents On Concept 12.1

Lessons	Activities	What you should do with your child
1	Activity 1	Discuss with your child the three states of matter on the Earth.
	Activity 2	Discuss with your child that the water found in three states solid, liquid and gas.
	Activity 3	Explain to your child that each matter has its own properties.
2	Activity 4	Digital extension activity.
	Activity 5	Explain to your child how to describe the three states of matter.
	Activity 6	Discuss with your child the differences between particles in each state of matter
3	Activity 7	Discuss with your child the differences between shapes in each state of matter.
	Activity 8	Digital extension activity.
	Activity 9	Digital extension activity.
	Activity 10	Explain to your child that the matter is something that we can feel, see or smell.
	Activity 11	Explain to your child that any matter is made up of very tiny particles.
4	Activity 12	Explain to your child how modeling the particles of matter.
	Activity 13	Discuss with your child how particles of any matter are very tiny.
5	Activity 14	Discuss with your child the importance of models.
	Activity 15	Explain to your child the arrangement of particles in each state of matter.
	Activity 16	Digital extension activity.
6	Activity 17	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 18	Discuss with your child how we use the three states of matter to prepare and cook food.
	Activity 19	Let your child review the main points in this concept.

Activity

1

Can You Explain?

- The opposite photo show liquid water, steam (water vapor) and glass which are different types of matter.
- Everything around us is made up of matter.



Matter :

It is anything that has a mass and takes up space.



Note

Any matter takes up space means that this matter has a volume.

► What are the different forms of matter that can be found in the world around us ?

- Most matter on the Earth is found in three main states or forms which are Solid, Liquid and Gas.
- To describe any matter, you should study its properties such as shape, volume (size), color, texture, hardness, temperature etc., so it is very important for scientists to know the properties of matter.
- All things in the world are made up of matter, so it is very important for scientists to know the properties of matter.
- Any matter is made up of tiny particles that we cannot see with our eyes.

► In this concept, we will study :

- States of matter.
- Particles of matter.
- Modeling the particles of matter.
- Tiny particles size.

vapor / steam
matter
mass
volume

بخار
مادة
كتلة
حجم
main
states / forms
texture
hardness

رئيسي
حالات
لمس
صلابة
properties
tiny particles
model
shape

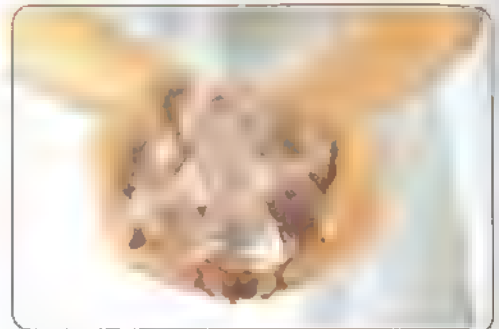
صفات / خصائص
جسيمات صغيرة
نموذج
شكل

Activity 2 States of Water

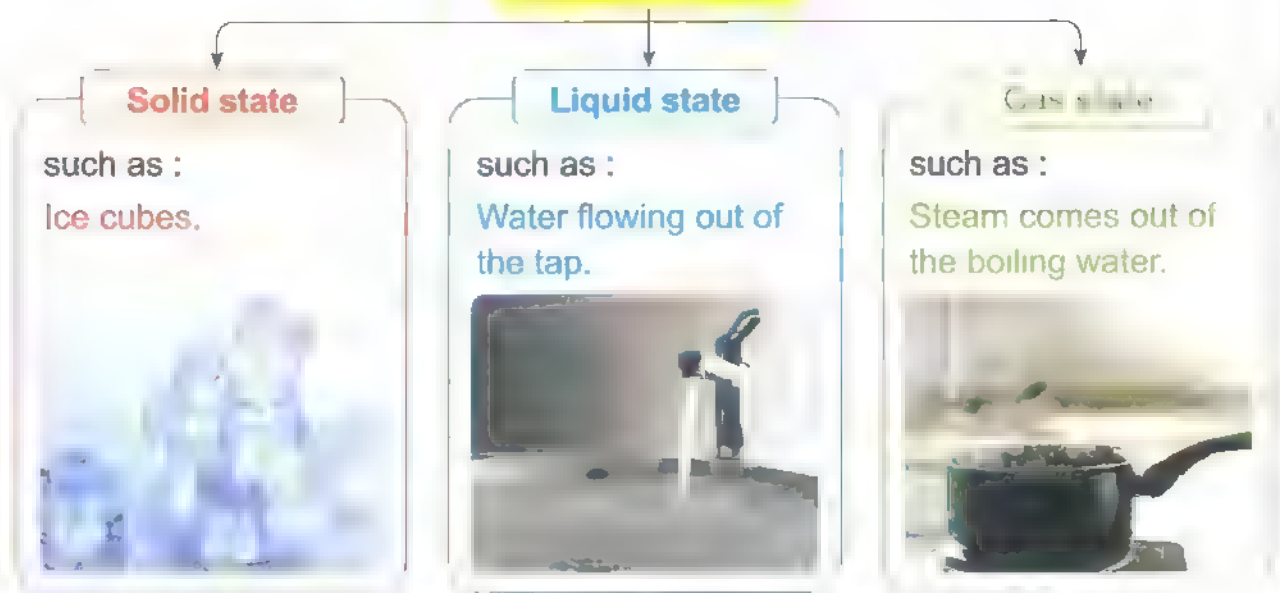
► Look at the opposite picture, then put (✓) or (x) :

1. Ice cubes are considered the liquid state of water. ()
2. Water is found on the Earth in the gas state only. ()

• In this activity, we will study the three states of water as an example that shows the three states of matter.



States of water



► From the previous diagram, you can observe that :

1. Water can be found in the three states of matter.
2. Water can be changed from one state into another. (as we are going to study in the next lessons).



Check your understanding

► Put (✓) or (x) :

1. Steam that comes out of a hot cup of tea is considered the gas state of water. ()
2. Water is found in five states on the Earth. ()

Activity 3 More About Matter

► From the previous activities, you have learnt that :

- Everything is made up of matter such as : _____ , _____ , _____ and **water** ... etc.
- Each matter has its own properties.
- Properties help us to describe any matter.



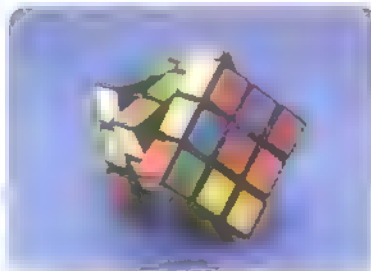
Note
Property : It is a characteristic (or quality) of a matter.

Properties of matter include

Color Matter may be colored with :



One color

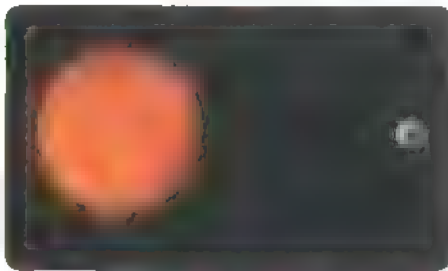


Many colors



Colorless (No color)

"Size" Volume Matter are found in different sizes :

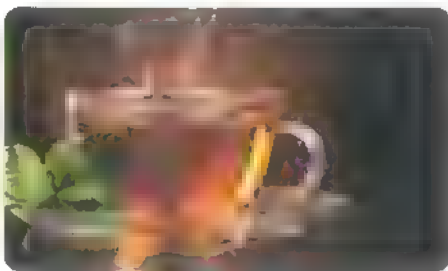


Bigger than our planet



So small, you cannot see them
such as germs

Temperature Some matter can be :



Hot



Cold

Shape Different matter have many shapes such as :



Round like a ball

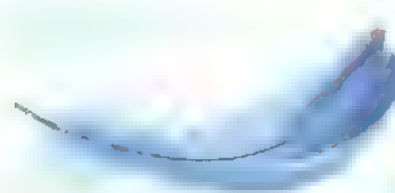


Square like a block

Hardness Matter may be :



Hard like a brick



Soft like a feather

Notes

Examples of solid matter	Examples of liquid matter	Examples of gas matter
Ice – Wood – Stone Iron – Sand	Water – Oil – Milk Vinegar – Gasoline.	Water vapor (steam) – Air – Oxygen – Carbon dioxide.



Check your understanding

► **Complete :**

1. To describe a matter, we must know its
2. Properties of matter include, shape and



Digital Extension Activity

Activity (4) " What Do You Already Know About Matter in the World Around Us ?"

in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

In the Assessment Book :

Try to answer
Self Assessment (19)

Revision on Lesson 7

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- 1. Matter can be found in states.
a. 2 b. 3 c. 6 d. 7
- 2. Water can be found in a solid state in the form of
a. ice. b. steam. c. sea water. d. boiling water.
- 3. An example of a gas is
a. chocolate. b. rock. c. pencil. d. oxygen.
- 4. The amount of space that a matter takes up is called
a. volume. b. mass. c. weight. d. area.
- 5. All of these substances are liquids, except
a. oil. b. milk. c. stone. d. vinegar.
- 6. Both and have the same state of matter.
wood-water plastic-oil wood-milk wood-plastic

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Carbon dioxide	a. is not a matter.
2. Sand	b. is a liquid matter.
3. Gasoline	c. is a gas matter.
	d. is a solid matter.

1.

2.

3.

Put (✓) or (X) :

- 1. Ice is considered the solid state of matter. ()
- 2. Matter never changes from one form to another. ()
- 3. All forms of matter are colored. ()
- 4. Volume is the space that is taken up by a matter. ()
- 5. All matter have only one shape. ()
- 6. All objects can be seen with the naked eye. ()

5 Write the scientific term of each of the following :

- 1. Anything that has a mass and a volume. (.....)
- 2. A property of matter by which we can distinguish between hot and cold objects. (.....)
- 3. The state of water after its freezing. (.....)

6 Complete the following sentences :

- 1. States of matter are, and liquid.
- 2. Iron and gold are examples of state of matter.
- 3. According to temperature, matter can be classified into and objects.
- 4. According to hardness of matter, a sponge and a feather are examples of matter, while a coin and a brick are examples of matter.
- 5. The state of an ice cube is, while the state of the air we breathe is

6 Cross out the odd word :

- 1. Oil – Milk – Water – Wood. (.....)
- 2. Plastic – Vinegar – Iron – Aluminium. (.....)
- 3. Coal – Carbon dioxide – Oxygen – Air. (.....)

7 Give reasons for :

- 1. Salt is a matter.
.....
.....
- 2. Rubber differs from iron. (according to their hardness).
.....
.....

8 What happens if ... ?

Water is heated in the kettle for few minutes. (according to the state of water after heating).

.....
.....

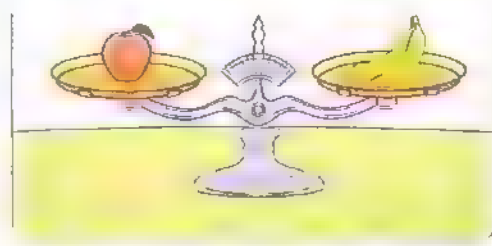
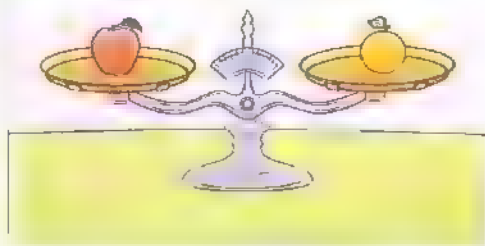
Material	Mass after 10 minutes
(A)	28 grams
(B)	25 grams
(C)	30 grams
(D)	22 grams

1. Which material absorbs the least amount of water ?

- a. A b. B c. C d. D

2. Which material absorbs the most amount of water ?

- a. A b. B c. C d. D



The mass of the two bananas is greater than the mass of the orange.

The mass of the apple is smaller than the mass of the orange.

The mass of the orange is smaller than the mass of one banana.

The mass of the orange is equal to the mass of the two bananas.

LESSON

2

Activity 5 Observing Matter

Look at opposite pages, then put (✓) or (✗)

- In cup (1), the wooden cube has a definite (fixed) shape. ()
- In cup (2), water doesn't take a space inside the cup. ()



(1)

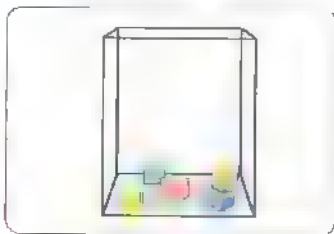


(2)

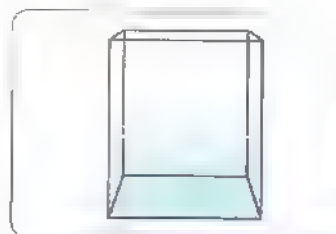
- In this activity, we will do an experiment to show how to describe the three states of matter (solids, liquids and gases).

Tools

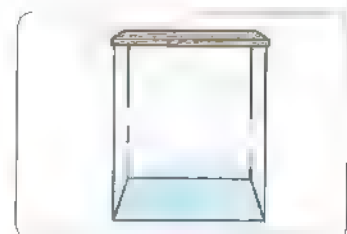
Three glass containers (A), (B) and (C).



Container (A)
contains plastic cubes



Container (B)
contains some water



Container (C)
contains steam

Step

Observe the properties of the contents of each container and record your observations in a table.

Observations

Matter	Shape	Volume	Solid , Liquid or Gas
Plastic cubes [in container (A)]	Have a definite shape	Have a definite volume	Solid
Water [in container (B)]	Has no definite shape	Has a definite volume	Liquid
Steam [in container (C)]	Has no definite shape	Has no definite volume	Gas

► Conclusions

- **Solids :**

Have definite (fixed) volume and shape.

- **Liquids :**

Have definite volume but they don't have definite shape so, they take the shape of their containers.

- **Gases :**

Have no definite volume and shape, so they take the volume and shape of their containers.



Note

Some gases can't be seen such as air, but :-

- You can see air move when the wind blows and moves some objects.
- You can see a balloon gets larger when you blow air into it.



Practice

► Put (✓) or (x) :

1. Liquid matter has a definite shape. ()
2. Gases have no definite volume and shape. ()

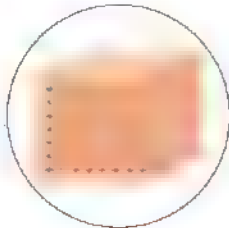
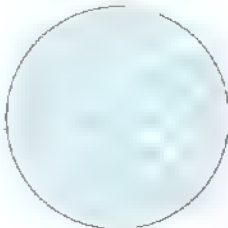
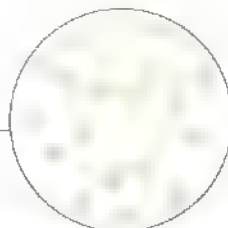
► Choose the correct answer :

1. matter has a definite shape and definite volume.
 a. Solid b. Liquid c. Gas
2. and are matter take the shape of their containers.
 a. Solid – liquid b. Solid – gas c. Liquid – gas

Activity 6

Matter

- Solids, liquids and gases are made up of very tiny things called **particles**.
- Particles of all matter are in continuous motion.
- The following table shows the differences between particles in each matter state :-

Particles of solid matter	Particles of liquid matter	Particles of gases matter
<ul style="list-style-type: none"> • They are very close to each other (packed tightly). • They have less energy. • They move only a little bit. 	<ul style="list-style-type: none"> • They have more spaces. • They have more energy. • They can move more freely. 	<ul style="list-style-type: none"> • They have a lot of spaces. • They have a lot of energy. • They move very freely.
		

► From the previous explanation, we can determine the state of matter by :

1. Describing the properties of matter.
2. The motion of particles of matter.

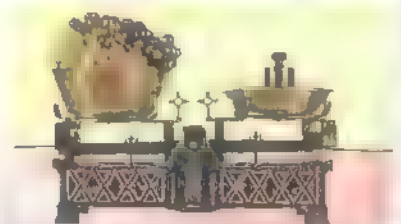
Measuring and observing matter

- Some properties of matter can be measured such as :

- We can measure the length of some matter using a ruler or a measuring tape (tape measure).



- We can measure the mass of matter using a scale.



Notes

1. Matter can change from one state to another state such as :



2. There are some things that are not matter such as light and sound which are forms of energy.



Check your understanding

► Complete :

1. All matter are made up of tiny
2. The particles of matter have a lot of energy.

► Choose the correct answer :

1. Particles of matter are very close to each other and they have less energy.

a. solids
b. liquids
c. gases
2. particles move less than liquid particles.

a. Solids
b. Liquids
c. Gases

In the Assessment Book :

Try to answer .

Self-Assessment (20)

Exercises on Lesson 2

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- Liquids have definite, but their are not definite.
 - volume – shape
 - color – volume
 - shape – volume
 - color – shape
- Both and are solids as they have definite shape and volume.
 - wood – oxygen
 - milk – iron
 - wood – iron
 - milk – oxygen
- One of the substances that doesn't take the shape of its container is
 - oil.
 - coin.
 - gasoline.
 - water.
- Both and take the shape of their container.
 - air – plastic
 - water – air
 - wood – air
 - water – plastic
- Gases have shape and volume.
 - definite – definite
 - no definite – no definite
 - definite – no definite
 - no definite – definite
- Particles of are very close to each other.
 - gold
 - steam
 - milk
 - oxygen
- Particles of all the following substances have a lot of energy, except
 - water vapor.
 - carbon dioxide.
 - oxygen.
 - rubber.
- To measure the length of a table, we can use a
 - thermometer.
 - balance scale.
 - cylinder.
 - measuring tape.

Choose from column (B) what suits it in column (A) :

Column (A)	Column (B)
1. Milk	a. its particles are packed tightly.
2. Air	b. its particles have medium energy.
3. Wood	c. its particles move very freely.
	d. its particles don't move at all.

1.

2. ...

3.

Put (✓) or (X) :

- 1. All forms of matter have volume. ()
- 2. Liquids don't take the shape of the container that they are placed in. ()
- 3. Both gold and milk have definite shape. ()
- 4. Gases keep their shape and volume whatever the container changes. ()
- 5. On transferring water from one pot to another, its volume will change. ()
- 6. Particles of water can move more freely than the particles of water vapor. ()
- 7. Particles of all matter are in a continuous motion. ()
- 8. Light and sound are forms of matter. ()

Write the scientific term in place of the following :

- 1. The state of matter that has definite volume and shape. (.....)
- 2. The state of matter that is characterized by having a definite volume but it doesn't have a definite shape. (.....)
- 3. Substances that take the shape and the volume of their containers. (.....)
- 4. The state of matter that has a lot of spaces between its particles. (.....)
- 5. The tool used to measure the length of a wall. (.....)

Complete the following sentences :

- 1. States of matter are, and gases.
- 2. In the matter, the volume and shape don't change.
- 3. Water is a matter in state, while water vapor is a matter in state.
- 4. Matter that takes the shape of its container, but its volume cannot be changed is
- 5. The of a pen can be measured by using a ruler.
- 6. Particles of matter are very close to each other.

Give reasons for :

- 1. Sugar is a solid matter.
.....
- 2. Wood has definite shape and volume.
.....
- 3. Oxygen has no definite shape or volume.
.....

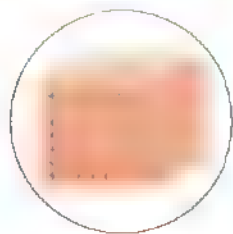
4. Particles of a piece of iron are very close to each other.

7 What happens to ... ?

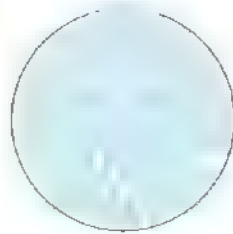
1. The shape of water if we put three equal amounts of water in three different containers.
2. The volume of a coin if we transfer it from a cup to another cup.

8 Study the following figures and answer the questions that follow.

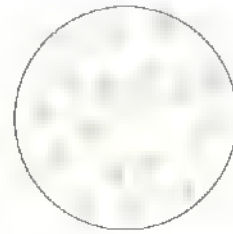
then put (✓) or (X) :



(1)



(2)



(3)

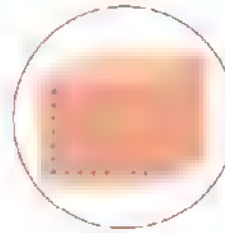
1. Figure (1) represents solid matter. ()
2. Figure (2) represents liquid matter. ()
3. By increasing the spaces between the particles of figure (2), this matter may change into solid state. ()
4. Particles of figure (1) have more energy than particles of figure (3). ()

Activity 7 States of Matter

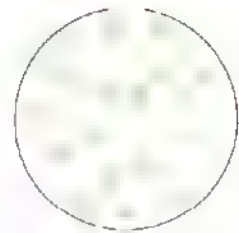
► Look at the opposite figures, then put (✓) or (x) :

1. Solid particles move freely more than liquid particles. ()

2. Gases matter have definite shapes. ()



Solid particles



Gas particles

States of matter

• State of matter is a certain form that matter can take which may be solid, liquid or gas.

► The following table shows the differences between the three states of matter :

The shape of solids matter	The shape of liquids matter	The shape of gases matter
<ul style="list-style-type: none"> • They have a definite (fixed) shape. • Their shape don't change unless something is happening to change them. 	<ul style="list-style-type: none"> • They don't have definite shape. • They take the shape of their containers. 	<ul style="list-style-type: none"> • They don't have definite shape. • They completely fill their containers and take their shapes.

Notes

1. Matter in any state (solid – liquid – gas) takes up space.
2. If there are two objects, they cannot take up the same space at the same time.



1. Liquids matter take the shape of their containers. ()
2. Gases matter have no definite shape. ()

- Which state of matter has a fixed shape ?
a. Solid. b. Liquid. c. Gas.
- _____ matter completely fill their containers and take their shapes.
a. Solids b. Liquids c. Gases



Activity (8) "Three States of Matter" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.



Activity 9 "What Form Is It?" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 10 What Is Matter?

Matter is something that we can



Such as
Air



Such as
Ball

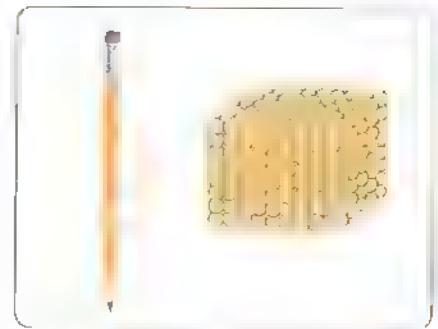


Such as
Flower



► What is matter actually made of ?

- Any matter such as your hand or desk or pencil is made up of millions of tiny particles that we cannot see with our eyes.
- Some matter are too small to see with human eye such as air and germs, but they are also made up of tiny particles.



Germs



Check your understanding

► Put (✓) or (x) :

- Any matter is made up of tiny particles. ()
- Table is an example of matter you cannot see with your eyes. ()

Activity 11 Particles of Matter

► You have learned in the previous activities that any matter is made up of tiny particles that we cannot see with our eyes, where :

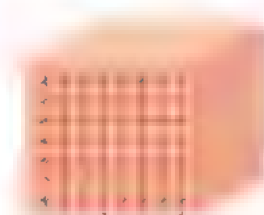
- Particles are known as **atoms and molecules**.
- Regular microscopes help us see some particles of matter.
- There are many different types of particles, where different kinds of matter are made of different kinds of particles such as :
 - Particles of gold are different from particles of iron.
 - Particles of water are different from particles of milk.



Particles of solids

They are packed closely together, so :

- They vibrate or move around their place.
- They can't move from one place to another and can't slide over each other.



Particles of liquids

They are held together more loosely, than particles of solids, so :

- They move faster than solid particles.
- They can slide over each other so, they take the shape of their containers.



Particles of gases

They are not held together, so :

- They move very quickly in all directions.
- They can spread out to fill up any container they put in.



Check your understanding

► Put (✓) or (x) :

1. Particles of solids can move freely from one place to another. ()
2. Liquid particles move faster than solid particles. ()

In the Assessment Book :

Try to answer :

Self Assessment (21)

Exercises on Lesson 3

Understand

Apply

Analyze

Evaluate

Create

1 Choose the correct answer :

- 1. The shape of is fixed as it is a matter.
 gold-liquid water-liquid air-gas gold-solid
- 2. Oil takes the of its container.
 a. volume b. shape c. color d. mass
- 3. If we pour an amount of milk from a container to another one has a different shape, so the shape of milk will and its volume will
 a. change-change. b. not change-not change.
 c. change-not change. d. not change-change.
- 4. Particles of vibrate around their place.
 a. glass b. air c. oxygen d. water
- 5. The movement of particles of water are slower than that of
 a. wood. b. plastic. c. air. d. gold.
- 6. The liquid matter is characterized by all the following, except that
 a. its particles move faster than solid particles.
 b. its particles move slower than gas particles.
 its particles can't spread to fill up any container they put in.
 its particles are held together more closely than solid particles.

2 Put (✓) or (X) :

- 1. Liquid particles move freely more than solid particles. ()
- 2. Gasoline takes the shape of its container. ()
- 3. Gases don't have a definite shape or volume. ()
- 4. Particles of an aluminium spoon are similar to particles of a golden ring. ()
- 5. Some particles of matter can be examined by regular microscopes. ()
- 6. The speed of water vapor particles is slower than that of water particles. ()
- 7. Two equal amounts of sugar and salt cannot take up the same space at the same time. ()
- 8. Particles of wood are different from particles of plastic. ()

Write the scientific term of each of it

-) • 1. A state of matter that has a fixed shape. (.....)
-) • 2. The building units of matter. (.....)
- 3. A device used to examine objects that are too small to be seen with the naked eye. (.....)

4. A state of matter that its particles vibrate around their place. (.....)
5. A state of matter that its particles move faster than solids and have a definite volume. (.....)

4 Complete the following sentences :

1. Any matter is made up of millions of tiny that we cannot see with our eyes.
2. The shape of matter doesn't change unless something is happening to change it.
3. Particles of matter are packed closely together.
4. Particles of liquid matter can move more faster than matter and more slower than matter.
5. Particles of matter can slide over each other so they take the of their containers.

5 Give reasons for :

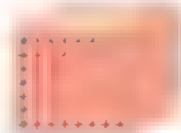
1. Air has no definite shape or volume.
.....
2. Particles of gases can spread out quickly to fill up any container they put in.
.....

6 What happens if ... ?

1. Water changes into ice. (according to its shape).
.....
2. A liquid changes into gas. (according to the speed of particles).
.....
3. We try to examine the particles of any substance with our naked eyes.
.....

Look at the opposite figures that represent

1. Matter in figure takes the shape of its container but its volume doesn't change.
2. Particles of figure move faster than that of figure and figure
3. Particles of figure are not held together.



Matter (A)



Matter (B)



Matter (C)

Activity 12 Modelling the Particles of Matter

- Look at the opposite picture, then complete the sentences using the following words :

[heat – liquid]

1. Water is the state of matter.
2. Ice needs to change into liquid state.



- When a cup of ice cubes exposed to the Sun in a hot summer day :



The Sun will heat up the particles of ice cubes.



The particles of ice cubes move faster and turned into liquid water.



The Sun heats up the particles of water so, they move faster and the water will evaporate.

- Using models is a way to study some scientific concepts that can make ideas more clear.
- Objects that are too small such as germs or too large such as solar system can be studied easily when using models.
- To make a model of particles that make up a matter, you can use ping pong balls as they are three-dimensional units and can be separated from each other.

So, you can use these balls to describe the movement of particles of the three states of matter.



Ping pong balls

Check your understanding

- Choose the correct answer :

1. When you heat a solid matter, the movement of its particles
 - a. becomes slower.
 - b. becomes faster.
 - c. doesn't change.
2. If you heat a liquid matter, it will change into
 - a. liquid
 - b. solid
 - c. gas

Activity 13

Tiny Particles Size

Tiny particles size

- The size of particles depends on :
 1. The type of particles.
 2. How particles connect with each other.
- The average size of a particle is so tiny that one of your hairs is about 150,000 to 300,000 particles.
- To see the components of one particle such as one blood cell, scientist cannot use the regular microscope, but they use a special microscope, called **electron microscope**.



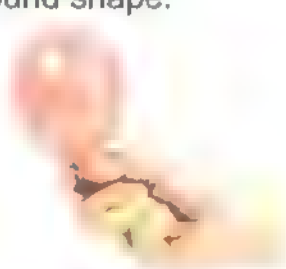

Blood cells



Electron microscope

► How can we show that particles exist ?

- To show that the invisible particles are really exist, we can use a gas matter such as air which is made up of invisible tiny particles as follows :

When you blow up a balloon	When you squeeze a balloon
<ul style="list-style-type: none"> • The particles of air inside the balloon move very quickly. • The particles of air hit and bounce the balloon from inside, so they produce a force that inflates the balloon and gives it a round shape. 	<ul style="list-style-type: none"> • The particles come close together so, the balloon becomes smaller. • If you squeeze more on the balloon, it will pop and the particles of air inside the balloon will escape. 

**Check your understanding****► Put (✓) or (x) :**

1. To see the components of a tiny particle, we need electron microscope. ()
2. When you blow up a balloon, the air particles inside the balloon move very quickly. ()

► Choose the correct answer :

1. To see the components of one blood cell, we need
 - a. electron microscope.
 - b. scale.
 - c. measuring tape.
2. The size of particles depends on all the following, except
 - a. the color of particles.
 - b. the type of particles.
 - c. the connection between particles.

In the Assessment Book :**Try to answer****Self-Assessment (22)**

Exercises on Lesson 4

Understand

Apply

Analyze

Evaluate

Create

Choose the correct answer :

1. By changing the of a matter, its state may change.
a. mass b. volume c. color d. temperature
2. If water is exposed to high temperature, its particles will move and the water may change into
a. faster-ice. b. faster-water vapor.
c. slower-ice. d. slower-water vapor.
3. We can use a model to study very large things such as
a. solar system. b. germs.
c. microbes. d. viruses.
4. By blowing up a balloon,
a. its volume decreases. b. its volume increases.
c. its color changes. d. its mass doesn't change.
5. To examine the structure of tiny particles of a matter, we can use
a. microscopes. b. balances.
c. thermometers. d. rulers.

Put (✓) or (X) :

1. Germs are very large organisms that can be seen with the naked eye. ()
2. Ping pong balls can be used to make a model of particles as they are three-dimensional units. ()
3. Air particles are visible as they are very large particles. ()
4. To see components of one particle such as a blood cell, we can use the regular microscope. ()
5. By squeezing a balloon, you decrease the space that the gas particles can occupy. ()
6. The type of particles affects their size. ()

Fill in the blanks :

1. The state of water after its heating for high temperatures. (.....)
2. A device used to examine one tiny particle such as a blood cell. (.....)

Complete the following sentences

1. When an ice cube is exposed to the Sun, the speed of movement of its particles will
2. Water evaporates when it is exposed to a temperature.
3. We can use ping pong balls to describe the movement of of the three states of matter.
4. To describe the particles of a matter in state by modeling balls, we should put the balls packed together.
5. Scientists cannot use the microscope to see the components of one blood cell.

Give reasons for :

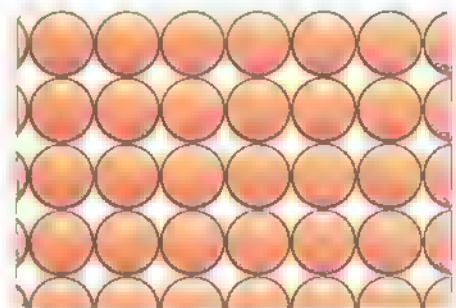
1. Using models to study some scientific concepts.
.....
2. Sometimes we need to use an electron microscope.
.....

What happens to ...?

1. The speed of particles of an ice cube when it is exposed to the Sun.
.....
2. The size of a balloon when you blow it up.
.....

Look at the opposite model that shows the particles of a substance then complete the following sentences

1. This model represent a substance in state.
2. If we want to make changes in this model to show this substance in a liquid state, we should the distances between balls.



► Look at the opposite picture, then put (✓) or (x)

1. This model represents the moon. ()
2. The model of the Earth shows how much of its surface is covered with water. ()



Globe

► Models help us understand things we cannot easily see such as :

- We cannot see the Earth which is too big while we are standing on it. But, we can observe and understand it using the model of globe shown the previous picture.

Model :

It is a copy that is similar to a real thing.

- Models may be drawings, objects or ideas that represent a real event, object or process.
- Models look like, move like or work like what they copy.

How do models help us look at big things ?

- Models can represent very big things in a smaller size, because it is hard to see them.
- Let's see two examples of models for very big things.

Example 1 : The Earth :

- A globe represents a model of the Earth which shows us :
 - The shape of the Earth.
 - How much of the Earth is covered with water.
 - Where different countries are located.



Globe

Example 2 : The solar system :

- Solar system is a very big place, planets and the Earth are very big objects.
- A model of the solar system helps us :
 - See all planets at once.
 - Compare between planets which one is biggest and which one is closest to the Earth.



Model of solar system

How do models help us look at small things ?

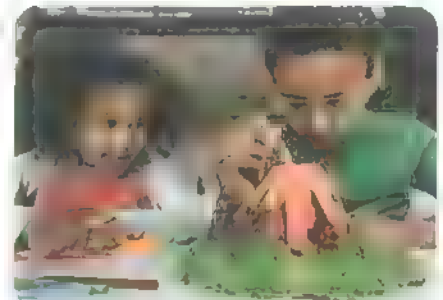
- Models can represent very tiny things in a bigger size, because it is hard to see them.
 - Germs are very tiny and they are spread around us which make us sick.
- A model of a germ helps us :
 - See the shape of a germ without microscope.
 - See different parts of germs which help them to spread from one person to another.



Models help us understand how things work

Example 1 : A model of a volcano :

- A model of a volcano shows us :
 - The shape of a volcano.
 - How the liquid that comes out of a volcano during a real eruption.



Model of volcano

Example 2 : A model of an airplane :

A model of an airplane shows us how it flies up into the air.



Model of airplane

► From the previous explanation it is clear that models help us :

- Teach something about the real things they copy.
- See and understand how things work.
- Learn about many things at just the right size.
- Know what we could not otherwise see.



Check your understanding

► Put (✓) or (x) :

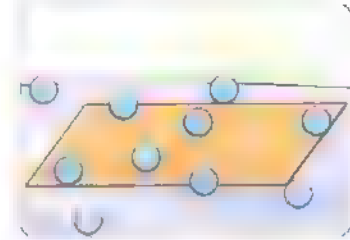
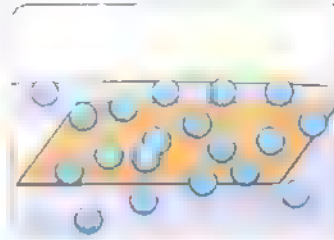
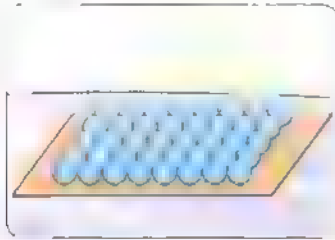
1. The globe shows where different countries are located. ()
2. To study germs we need to bring model of them in big suitable size. ()

Activity 15 Modelling States of Matter

- In this activity, we will observe three models that show the arrangement of particles in each state of matter. (solids, liquids and gases).

► Tools

Beads fixed by glue on three pieces of cardboard which represent the different arrangement of particles in each state of matter.



► Step

Observe the three models of three states of matter and write the arrangement of particles in each state.

► Observations

The arrangement of beads in :

- Solid model : Beads are arranged in a regular pattern.
- Liquid model : Beads are little far from each other and not arranged in a pattern.
- Gas model : Beads are so far from each other and not arranged in a pattern.

► Conclusions

The arrangement of particles in :

- **Solid matter** : They have a regular pattern (organized).
- **Liquid matter** : They have a random arrangement (not well organized).
- **Gas matter** : They have a random arrangement (not organized at all).



Check your understanding

► Put (✓) or (x) :

1. Particles of gas matter are organized. ()
2. Liquid matter has particles arranged in a pattern. ()



Digital Extension Activity

Activity (16) " Particles Always in Motion " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Exercises on Lesson 5

● Understand

● Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

1. The model of the Earth shows how much of its surface is covered with
a. gasoline. b. water. c. milk. d. animals.
2. We can see all planets of the _____ system including the Earth by using a model.
a. solar b. digestive c. respiratory d. muscular
3. Some liquids come out of a during its eruption.
a. star b. wooden piece c. volcano d. plastic piece
4. Particles of are organized and have a regular pattern.
a. solids only b. gases only
c. solids and liquids d. liquids and gases
5. Gases differ from solids and liquids in that gases
a. can be poured. b. fill any container they are put in.
c. have a definite shape. d. have a definite volume.

Put (✓) or (X) :

1. Models help us understand things that we can easily see with our eyes. ()
2. Solar system contains only one planet which is the Earth. ()
3. Models help us understand ideas, objects or processes. ()
4. We can see the shape of a germ by using a special microscope. ()
5. Most germs can spread through the air from a person to another. ()
6. A model of an airplane shows us how it flies up into the air. ()

1. A model is a simplified representation of a real thing.

1. A model of the whole world that is made in the shape of a large ball. (.....)
2. A copy that is similar to a real thing which we cannot observe with our eyes. (.....)

4 Complete the following sentences :

1. Water vapor particles are loosely packed, so that water vapor do not have a definite or
2. The Earth is a planet in the system.

3. We can study the location of countries by using a _____ which represents a model of the Earth.
4. A model of a germ helps us to see its shape without using a _____ which is used to magnify tiny objects.
5. Liquids that come out of a volcano have definite _____ but they have no definite _____.

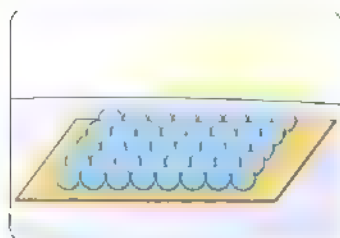
Give a reason for the following :

Both liquids and gases don't have a definite shape and take the shape of their containers.

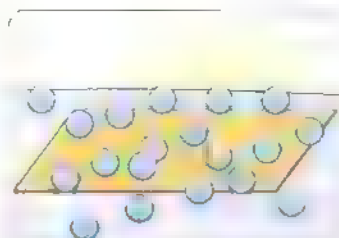
What happens to ...?

The arrangement of particles of water after its freezing.

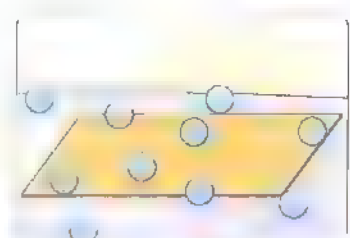
Fill in the blanks with suitable words or phrases to complete the sentences :



(1)



(2)



(3)

1. Beads of figure _____ could represent the particles of a rock on the Earth's surface.
2. Beads of figure _____ could represent the particles of river water on the Earth.
3. Beads of figure _____ could represent the particles of air that surrounds the Earth.
4. By heating the particles of figure (2), they will be similar to that of figure _____.

Activity 17 Record Evidence Like A Scientist

- ▶ In this concept, you have learned a lot about the three states of matter and the properties of each state.
- Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

Step 1 The Question

What are the different forms of matter that can be found in the world around us ?

Step 2 My Claim

Step 3 My Evidence

Step 4 My Scientific Explanation

Activity 18 STEM In Action

► Look at the opposite picture, then put (✓) or (✗) :

1. The smell of food is a gas state of matter.

()

2. Some liquid matter are used in preparing food such as oil.

()



Careers and States of Matter

► We use the three states of matter to prepare and cook different types of food such as :

Solid matter	Liquid matter	Gas matter
<ul style="list-style-type: none"> • Rice. • Pasta. • Frozen vegetables. 	<ul style="list-style-type: none"> • Water. • Oil. • Vinegar. 	<ul style="list-style-type: none"> • Natural gas used in gas ovens. • Steam of boiling water.

Scientist chef

- Chefs use science during preparing dishes.
- Chefs use different states of matter to change ingredients such as :

1. Boiling some water to cook pasta or rice, where liquid water changes into steam which is a gas matter.



2. Freezing vegetables keep them fresh and ready to use for longer periods of time.



rice
ingredients
scientist

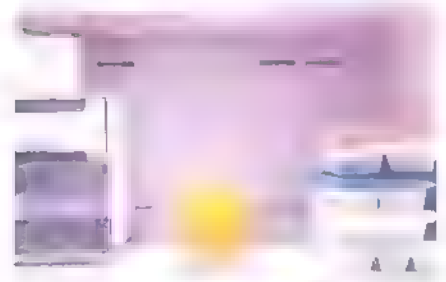
أرز
مكونات
عالم
pasta
fresh
careers

مكرونة
طازج
وظائف

frozen vegetables

خضروات مجمدة

3. Leave a cup of juice or milk in freezer to change from liquid state into solid state.



Check your understanding

► Choose the correct answer :

- 1.** All the following are solid matter are used in preparing food, except
- a. water. b. oil. c. rice.
- 2.** When you leave a cup of water in freezer, it will change into state.
- a. solid b. liquid c. gas

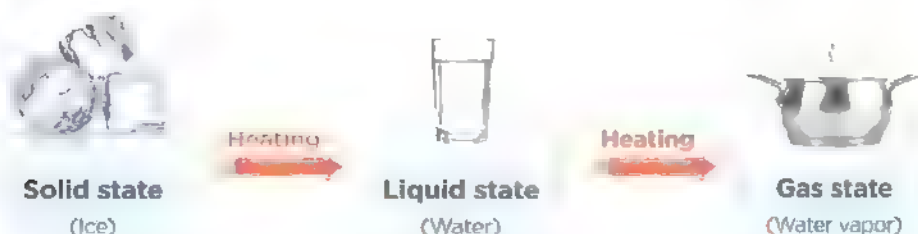
Activity 19 Review : Matter in the World Around Us

- We can summarize this concept in the following main points

Matter :

It is anything that has a mass and takes up space.

- Most matter on the Earth is found in three main states or forms which are solid, liquid and gas.
- Each matter has its own properties.
- Any matter is made up of tiny particles that we cannot see with our eyes.
- Particles of all matter are in continuous motion.
- Determine the state of matter by :
 1. Describing the properties of matter.
 2. The motion of particles of matter.
- Matter can change from one state to another state such as :



Model :

It is a copy that is similar to a real thing.

- Models look like, move like or work like what they copy.
- Models can represent very big things in a smaller size such as model of the Earth and the solar system.
- Models can represent very tiny things in a bigger size such as a model of a germ.
- Models can help us :
 - Teach something about the real things they copy.
 - See and understand how things work.
 - Learn about many things at just the right size.
 - Know what we could not otherwise see.

Points of comparisons	Particles of solid matter	Particles of liquid matter	Particles of gas matter
Spaces between particles :	They are very close together so, solid objects are hard.	They have more spaces but still (held) close together.	They have a lot of spaces (are not held together).
Energy of particles :	They have more energy.	They have less energy.	They have a lot of energy.
Movement of particles :	They vibrate or move around their place.	They move faster than solid particles.	They move very freely and quickly in all directions.
Spreading of particles :	They can't move from one place to another & can't slide.	They can slide over each other so, they take the shape of their containers.	They can spread out to fill up any container they put in.
Arrangement of particles :	They are arranged in a regular pattern (organized).	They have a random arrangement (not well organized).	They have a random arrangement (not organized at all).
Shape :	They have a definite (fixed) shape.	They don't have definite shape.	They don't have definite shape.

In the Assessment Book :

Try to answer :

• Self-Assessment (24)

• Mode. Exam on concept (2 1)

Exercises on Lesson 5

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- When we keep water inside the freezer, the state of water changes from _____ into _____.
 a. liquid – gas. b. liquid – solid. c. solid – liquid. d. gas – liquid.
- All the following are liquid matter that are used in preparing food, except ...
 a. water. b. vinegar. c. oil. d. rice.
- You can see different states of matter in this picture.
 a. two b. three
 c. four d. five
- A and are examples of solids.
 a. chair – ice b. juice – ice c. ruler – steam d. bottle – milk



Put (✓) or (X) :

- Frozen vegetables and vinegar have definite shape. ()
- Steam of boiling water is considered the gas state of water. ()
- Natural gas used in gas oven has no definite shape or volume. ()
- Most of ingredients of vegetables salads are in solid form. ()

Complete the following sentences (Use the words in the box)

(solid – liquid – gas – space – containers – particles)

- The state of matter that has a definite volume, but it doesn't have a definite shape is
- Volume is the amount of that matter takes up.
- We can classify the types of matter into liquid, and
- Matter is made up of tiny
- Liquids take the shape of their

Give a reason for the following :

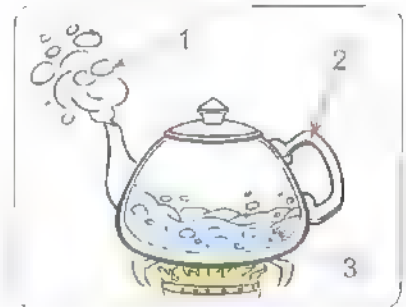
Oil used in cooking is considered as an example of liquid matter.

5 What happens to ...?

The state of milk if we put small amount of it in the freezer for few hours.

Look at the opposite figure, then put (✓) or (X) :

1. Label ① refers to a matter in liquid state. ()
2. Label ② refers to a matter in solid state. ()
3. Label ③ refers to a matter that its shape and volume don't change. ()
4. Particles of matter ① move slower than particles of matter ③. ()



Model Exam on Concept (2.1)

Total mark

20

(5 marks)

1. Iron and gold are examples of state of matter.
2. Matter that takes the shape of its container, but its volume cannot be changed is
3. Any matter is made up of millions of tiny that we cannot see with our eyes.
4. Scientists cannot use the microscope to see the components of one blood cell.

(B) Give a reason for the following :

Both liquids and gases don't have a definite shape and take the shape of their containers.

(A) Choose the correct answer :

(5 marks)

1. A and are examples of solids.
a. chair – ice
b. juice – ice
c. ruler – steam
d. bottle – milk
2. The amount of space that a matter takes up is called
a. volume.
b. mass.
c. weight.
d. area.
3. One of the substances that doesn't take the shape of its container is
a. oil.
b. coin.
c. gasoline.
d. water.
4. Particles of vibrate around their place.
a. glass
b. air
c. oxygen
d. water

(B) What happens to ... ?

The size of a balloon when you blow it up.

(A) Put (✓) or (X) :

(5 marks)

1. Models help us understand things that we can easily see with our eyes. ()
2. Steam of boiling water is considered the gas state of water. ()
3. Matter never changes from one form into another. ()
4. Light and sound are forms of matter. ()

(B) Cross out the odd word :

1. Oil – Milk – Water – Wood. (.....)
2. Plastic – Vinegar – Iron – Aluminium. (.....)

(A) Write the scientific name of each of the following :

1. The tool used to measure the length of a wall. (.....)
2. The building unit of matter. (.....)
3. A device used to examine objects that are too small to be seen with the naked eye. (.....)
4. The state of water after its heating for high temperatures. (.....)

(B) Choose from column B, what is in column A.

(A)	(B)
1. Carbon dioxide	a. is a solid matter.
2. Sand	b. is a liquid matter.
	c. is a gas matter.

1.

2.

Concept

2.2

Describing and Measuring Matter





Learning outcomes

By the end of this concept, your child will be able to :

- Classify materials based on their properties and describe patterns in the properties of similar materials.
- Choose the appropriate tools to measure the size and volume of different kinds of materials in different states of matter.
- Plan and conduct investigations to gather and record information about the properties of various materials.
- Analyze data to identify unknown materials.

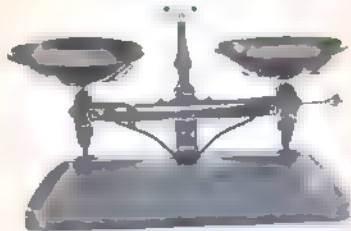
Key vocabulary

- | | |
|------------|-------------|
| • Mass | • Property |
| • Material | • Substance |
| • Matter | • Volume |
| • Measure | |

Notes For Parents On Concept 12.1

Lessons	Activities	What you should do with your child
1	Activity 1	Explain to your child how matter is described and measured.
	Activity 2	Discuss with your child the kinds of materials which people use to make roofs of homes and buildings.
	Activity 3	Explain to your child how to describe and measure matter.
2	Activity 4	Let your child think about the differences between the physical properties of matter.
	Activity 5	Digital extension activity.
	Activity 6	Discuss with your child about the physical properties and chemical properties of matter.
	Activity 7	Digital extension activity.
	Activity 8	Digital extension activity.
3	Activity 9	Explain to your child how to measure different physical properties of matter.
	Activity 10	Apply with your child what he/she has learned about measuring matter.
4	Activity 11	Discuss with your child about the useful properties of materials.
	Activity 12	Let your child think about uses of some matter and their properties.
5	Activity 13	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 14	Discuss with your child about the importance of measuring matter in different careers or jobs.
	Activity 15	Let your child review the main points in this concept.

Activity 1 Can You Explain?



► In the previous concept, you have learned about matter and its states.

► How is matter described and measured ?

- Matter can be described by its color, shape, texture, or size.
- We can also describe matter based on its state (solid, liquid or gas).
- We can measure some properties of matter using some tools like :
 - A balance to measure its mass.
 - A ruler to measure its length.
 - A thermometer to measure its temperature.

► In this concept, we will study :

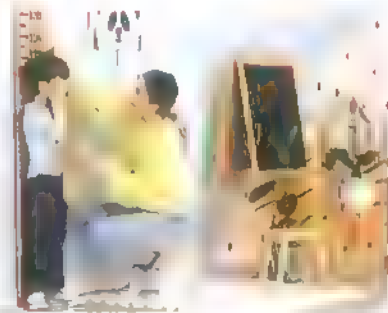
- Describing and measuring matter.
- Properties of matter.
- Measuring matter.
- Uses of matter.
- Careers and measuring matter.

Activity 2 A Roof for Every Type of Climate

► Look at the following pictures, then put (✓) or (x) in front of the following sentences :

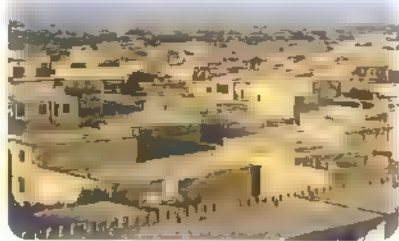




❶ Will snow and rain enter this house from the roof ? ()



❷ Can we measure the height of this boy by using tape measure ? ()

► In this activity we will know some kinds of materials which people use to make roofs of homes and buildings.

	Material of the roof	
 Desert Home	Made of strong stones.	- It is flat. - It protects the home from dust and dirt.
 Cold weather Home	Made of ceramic tiles (ceramic bricks).	- It is slanted (inclined). - It protects the home from rains.
 Tropical Rainforest Home	Made of leaves and sticks.	- It is slanted (inclined). - It protects the home from animals getting inside.

roof

flat

ceramic tiles

slanted

سقف

مسطحة

بلاط السيراميك

مائل

tropical rainforest

dust

stick

الغابات الاستوائية المطيرة

غبار

عصا

desert

dirt

inclined

صحراء

تراب

مائل / منحدر

 **Note**

The kind of material used to make a roof depends on the climate where the home is located.



Check your understanding

► Put (✓) or (x) :

1. The desert home roof made of leaves and sticks. ()
2. Roofs of buildings protect them from rain, animals, dust, dirt or other things getting inside. ()
3. The tropical rainforest home has flatten roof. ()

► Choose the correct answer :

1. The roof of desert home is made of

a. ceramic tiles.	b. leaves and sticks.
c. strong stones.	d. ceramic bricks.
2. The kind of material used to make a roof depends on the where the home is located.

a. height	b. climate	c. location	d. roof
-----------	------------	-------------	---------

Activity 3

What Do you Already Know About Describing and Measuring Matter?

- Everything around us is made of matter, Now we will learn about how describing and measuring matter.






Describing Matter

- You already know what is the matter and it could be a solid, a liquid or a gas.
- Matter can be described by its color, shape, odor, texture and size.



Measuring matter

- Each property of material can be measured by using a special measuring tool. The following table shows some properties of matter and the measuring tool used to measure each of them.

Property	Volume	Length	Mass	Temperature	
Tools					
	Measuring cup	Tape Measure	Ruler	Balance	Thermometer



Note

You may need to measure more than one property of material to determine if this material is the right one you can use in a certain purpose or not.



Check your understanding

- Put each of the following tools in front of the suitable sentence.

(Measuring cup - Thermometer - Ruler - Balance)

- A tool is used to measure the mass of materials. ()
- A tool is used to measure the temperature of materials. ()
- A tool is used to measure the volume of materials. ()
- A tool is used to measure the length of materials. ()

In the Assessment Book :

Try to answer .

Self-Assessment (25)

Exercises on Lesson 1

● Understand

○ Apply

● Analyze

● Evaluate

● Create

1 Choose the correct answer :

1. All the following can be used to describe matter except
 a. shape. b. price. c. color. d. texture.
2. We can measure the mass of a cube of ice by using a
 a. thermometer. b. ruler. c. measuring cup. d. balance.
3. Which of the following homes have an inclined roofs ?
 a. Desert homes only.
 b. Tropical rainforest homes only.
 c. Desert homes and cold weather homes.
 d. Tropical rainforest homes and cold weather homes.
4. Homes which are built in a cold weather area have roofs made up of
 a. ceramic tiles. b. strong stones.
 c. carton paper. d. leaves and sticks.
5. You can measure the length of your friend by using a
 a. thermometer. b. tape measure.
 c. balance. d. measuring cup.
6. We can identify milk by determining its
 a. color and texture. b. shape and odor.
 c. color and size. d. color and taste.

2 Choose from column (B) what suits it in column (A) .

Column (A)	Column (B)
1. Thermometer	a. is used to determine the length of a book.
2. Ruler	b. is used to determine the mass of some apples.
3. Measuring cup	c. is used to determine the temperature of a hot cup of tea.
4. Balance	d. is used to determine the volume of an amount of water.
	e. is used to determine the shape of a book.

1. 2. 3. 4.

Put (✓) or (X) :

1. We can describe a solid matter by its color and shape. ()
2. The roof of tropical rainforest home is made up of leaves and sticks. ()
3. The roof of desert home is made up of strong stones to protect it from snow. ()
4. We can measure the volume of an amount of oil by using tape measure. ()
5. The length of the classroom wall is measured by using a balance. ()
6. You can use thermometer to measure the temperature of a hot cup of water. ()
7. We can differentiate between sugar and salt by using their color. ()

Write the scientific term of each of the following :

1. A material that is used to build the roofs of cold weather homes. (..)
2. A material that is used to build the roofs of desert homes. (..)
3. The property of matter which is measured by the measuring cup. (..)
4. The property of matter which is measured by the balance. (..)
5. The property of matter which is measured by the tape measure. (..)

Complete the following sentences :

1. We can differentiate between ice and water as ice is a state while water is a state.
2. The of your school bag can be determined by a balance.
3. In the Earth's polar zone, people use in building their home roofs to protect them from
4. We can use different materials to make a roof, depending on the where the home is located.
5. You can use a to measure the mass of matter, while you can use a to measure its temperature.
6. You can use a ruler to measure the of your book, while you can use a balance to measure its

Give reasons for :

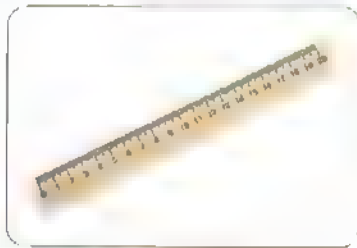
1. The roof of desert home is made of strong stones.
.....
2. The roof of tropical rainforest home is made of leaves and sticks.
.....

7 What happens if ... ?

The roofs of cold weather homes is flat.

.....

Choose the suitable tool to measure something (total, length, mass, volume, temperature) (you can choose the same tool more than once) :



Tool (A)



Tool (B)

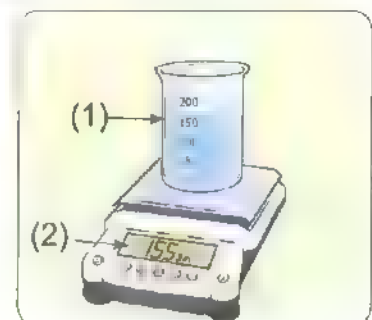


Tool (C)

1. You can measure the height of your chair by using tool (.....)
2. You can measure the mass of your copybook by using tool (.....)
3. You can measure the volume of the water that is found in your bottle by using tool (.....)
4. You can measure the length of your pencil case by using tool (.....)

From the opposite figure, tool (1) is used to measure of water, while tool (2) is used to measure of tool (1) and water.

- a. mass – length
- b. volume – temperature
- c. mass – volume
- d. volume – mass



Activity 4 The Case of the Unknown Mixture

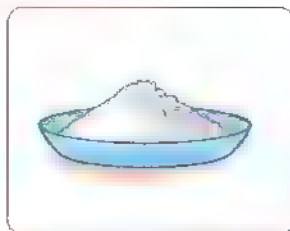
► Look at the following picture, then put (✓) or (x) in front of the following sentences :

- The material of the paper is changed after its burning. ()
- Paper has ability to rust. ()



► In this activity we will examine a variety of substances that look alike. All substance in this activity are known, but one of them is unknown. We will use our senses to describe the properties of each substance.

Tools



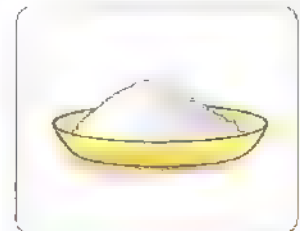
Sugar



Salt



Flour



Unknown mixture



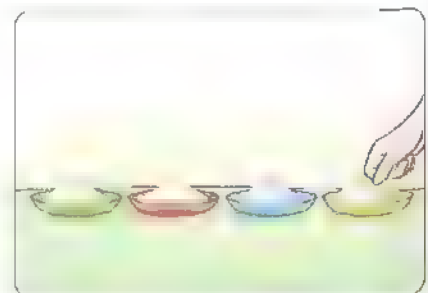
Lens

Note

The unknown mixture is a mixture of two substances found in the materials available to you in this activity.

Steps

1. Check (examine) the four plates in front of you and touch all the substances with your hand to feel their textures.



2. Smell all the substances and know the odor of all of them.



3. Use the lens to observe the shape of crystals of each substance.



► Observations

1. All substances have the same color.
2. The substances have different odors.
3. The substances are made up of :
 - Large crystals as in sugar.
 - Very fine particles as in flour.
 - A mixture of large crystals and very fine particles as in the unknown mixture.

💡 Note

According to the previous observations we can find out that the unknown mixture is a mixture of sugar and flour.

► Conclusion

Color, texture, odor and shape are some of the properties of matter that are called physical properties.



Check your understanding

► Complete the following sentences :

1. Color and texture are from the properties of matter.
2. Salt have crystals, while have very fine particles.



Digital Extension Activity

Activity (5) " Shape and Volume of Liquids and Solids " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Activity 6 Properties of Matter

- You have learned different ways to describe and measure matter.
- Now we will learn more ways that matter can be observed and measured.

Physical properties

- Physical properties of matter are :



Notes

1. You can observe the physical properties with your five senses.
2. You can use words such as rough, blue, round and sweet to describe the physical properties.

Chemical properties

Chemical properties of a material can be observed and measured by the changes that happen in this material when it interacts with other materials.

Examples of chemical properties

► The ability to burn :

Such as when a paper interact with fire, the paper becomes ash.

► The ability to rust :

Such as when an iron nail interact with water and air, the iron nail rusts.



observe
iron nail
ash

ملاحظة
مسامير
رماد

chemical properties
rough

الخواص الكيميائية
قاس

interact
sweet

تفاعل
حلو

Volume and Mass

Now, let's study volume and mass that are considered important properties of matter.

Volume

It is the amount of space that matter takes up.

The measuring units of volume are :

- Liters (L).
- Milliliters (mL).
- Cubic centimeters (cm³).

$$1\text{L} = 1000\text{ mL} = 1000\text{ cm}^3$$

Ex. : A big bottle of water contains 1 liters or more.



Mass

It is a measure of the amount of matter.

The measuring units of mass are :

- Gram (g).
- Kilogram (Kg).

$$1\text{ Kg} = 1000\text{ g}$$

Ex. : A paperclip has a mass about 1 gram.



Note

One liter of water has a mass of 1 kilogram.



Temperature

- In the previous concept you have learned that matter is made up of particles that are in continuous motion.
- **Temperature** is a measure of how quickly the particles in a matter are moving.

Notes

1. Quickly moving particles produces more heat energy than slower moving particles.
2. Volume, mass and temperature are properties of matter that you can measure.



Check your understanding

► Put (✓) or (x) :

1. The ability of matter to burn and rust are considered from chemical properties of matter. ()
2. The measuring units of volume are liters, milliliters and cubic centimeters. ()
3. Quickly moving particles produces less heat energy than slower moving particles. ()



Digital Extension Activity

Activity (7) " **Observable Properties** " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.



Digital Extension Activity

Activity (8) " **Does Gas Have Mass** " in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

In the Assessment Book :

Try to answer .

Self-Assessment (26)

Exercises on Lesson 2

● Understand

○ Apply

● Analyze

● Evaluate

● Create



Choose the correct answer :

- 1. We can differentiate between salt and flour through all the following properties except the
 a. shape of particles. b. texture of particles.
 c. taste. d. color.
- 2. All the following are physical properties of matter except
 a. color. b. rusting. c. texture. d. shape.
- 3. The physical property of milk through which you can see it is the of it.
 a. odor. b. texture. c. color. d. taste.
- 4. Burning of wood is considered as of matter.
 a. only physical property
 b. only chemical property
 c. both physical and chemical properties
 d. neither physical nor chemical properties
- 5. When the iron interacts with water and air, it
 a. becomes ash. b. becomes powder.
 c. burns. d. rusts.
- 6. We can measure the volume of a liquid by all the following units except
 a. kilogram. b. milliliters.
 c. cubic centimeters. d. liters.
- 7. The volume of one liter of water has a mass of
 a. one gram. b. one kilogram. c. one milliliter. d. one cubic centimeter.
- 8. The volume of 1000 cubic centimeters of a liquid is equal the same volume of
 a. 1 kilogram. b. 1 gram. c. 1 centimeter. d. 1 liter.
- 9. When particles of matter move quickly they produce more energy.
 a. thermal b. light c. sound d. solar
- 10. All the following properties of matter can be measured by different tools except
 a. mass. b. volume. c. color. d. temperature.

Put (✓) or (X) :

1. Salt and sugar have the same color and odor. ()
2. We can differentiate between sugar and flour by texture only. ()
3. Shape is one of chemical properties of matter. ()
4. Burning of fuel is considered from chemical properties of fuel. ()
5. All physical properties of matter can be measured. ()
6. When we put an iron nail in water and then leave it in air, it will rust. ()
7. 1 kilogram of water has a volume equals 1000 milliliters. ()
8. The temperature increases by increasing the speed of moving particles of a matter. ()

Fill in the blank with the correct word or phrase.

1. The properties of matter which you can observe them by using your five senses. (.....)
2. The properties of matter which can be observed and measured by the changes that happen when the material interacts with other materials. (.....)
3. It is the amount of space that matter takes up. (.....)
4. It is a measure of the amount of matter. (.....)
5. It is a measure of how quickly the particles in a matter are moving. (.....)

Complete the following sentences by using the words below.

(one thousand – chemical – temperature – mass – physical – rough – odor)

1. Both of odor and texture of matter are considered from the properties of matter.
2. You can identify the of a juice by using the sense of smell.
3. We can describe the texture of sugar crystals by saying "it has crystal texture".
4. The ability of a piece of iron to rust is from the properties of matter.
5. The volume of 1 liter of water has a of 1 kilogram.
6. The mass of 1 kilogram of apple equals the mass of pieces of paper clip.
7. By decreasing the speed of particles of a matter its will decrease.

 Give reasons for :

1. Rusting of iron is considered from chemical properties of matter.

2. When the particles of a matter move quickly, its temperature increases.

 6 What happens if ... ?

1. A piece of paper interact with fire.

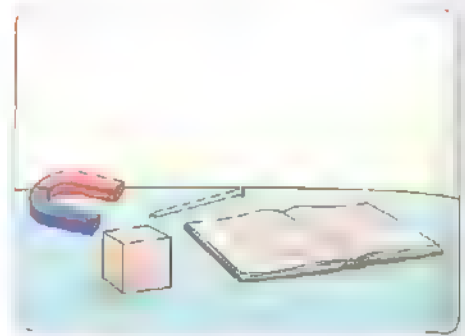
2. The speed of particles of a matter decreases. (according to its temperature).

 Put letter (P) in front of physical properties and letter (C) in front of chemical properties of the different matter below :

- | | |
|---|---------|
| 1. The white color of milk. | (.....) |
| 2. The ash produced from burning a paper. | (.....) |
| 3. The large crystals of salt particles. | (.....) |
| 4. The odor of perfume. | (.....) |
| 5. The rusting of a piece of iron. | (.....) |
| 6. The sweet taste of sugar. | (.....) |
| 7. The round shape of a ball. | (.....) |

► Look at the following picture, then choose the correct answer :

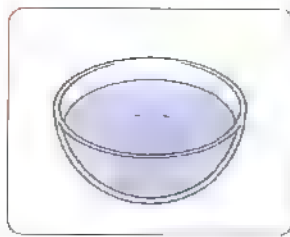
- Which material will be attracted to the magnet ?
(Wood – Iron nail – Book)



• You have learned the properties of matter and how to describe and measure it.

► In this activity we will measure different physical properties of matter.

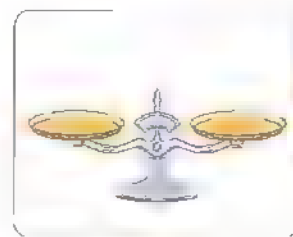
► Tools



Basin containing water



Magnet



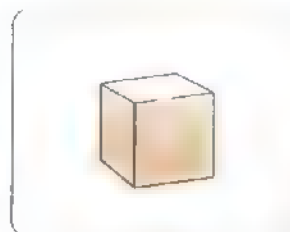
Balance



Stone



Iron nail



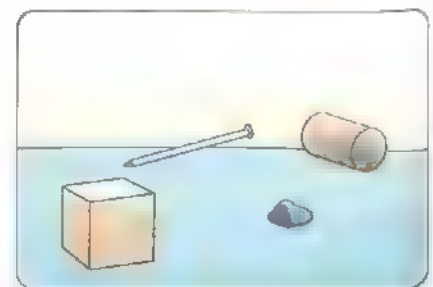
Piece of wood



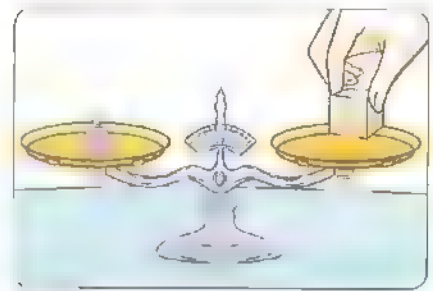
Piece of cork

► Steps

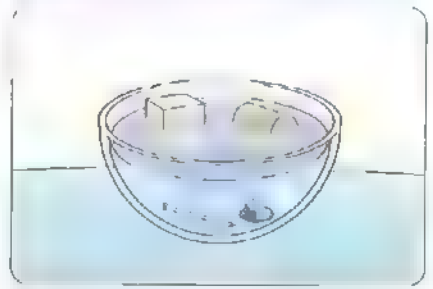
1. Hold the magnet near to each of the previous substances, and observe what substances are attracted to the magnet.



2. Measure the mass of each substance by using the balance.



3. Put all substances in the basin that contains water to observe which materials will float and which will sink.



4. Record your results in the following table.

► **Observations** The table of observation :

Substance	Substance 1	Substance 2	Substance 3	Substance 4
Attracted to magnet or not	Not attracted	Attracted	Not attracted	Not attracted
Mass (g)	50	30	100	20
Sink or float	Sinks	Sinks	Floats	Floats

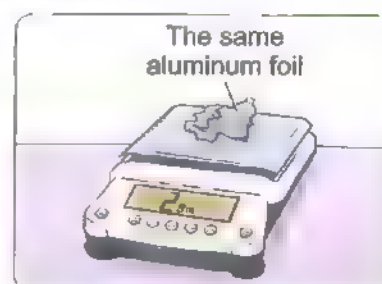
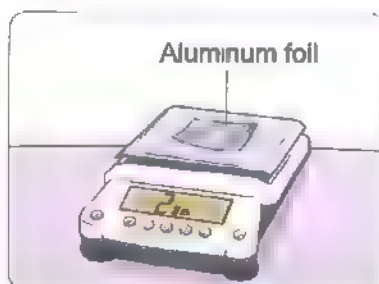
► **Conclusions**

- Some substances are attracted to the magnet and some other substances are not attracted to the magnet.
- Floating and sinking of substances don't depend on their masses.

Activity 1: The shape of material doesn't affect its mass

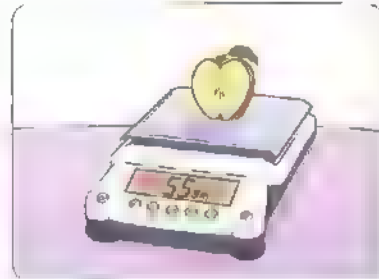
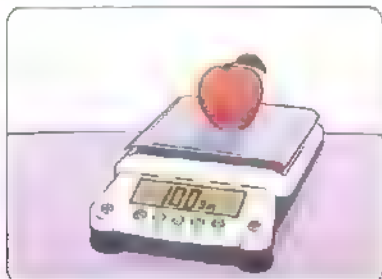
1 The shape of material

Changing the shape of material doesn't affect its mass.



2 The size of material

If you cut an apple in two half and measure the mass of one half, the mass would be nearly half the mass of the original apple.



Check your understanding

► Put (✓) or (x) :

1. All substances are attracted to the magnet. ()
2. Heavier objects will sink in water and lighter objects will float on water. ()
3. Changing the shape of material doesn't affect its mass. ()
4. Floating and sinking of substances don't depend on their masses. ()

Activity 10 Measuring Matter

- ▶ You have learned a lot about using measurements to compare materials and properties of matter.
- ▶ In this activity you will apply what you have learned about measuring matter.
 - In front of you three materials, observe the data of each of them to compare between their properties.



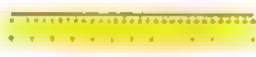

- ▶ Based on the previous data we can conclude that :

- Material (1) has the **most mass** although it doesn't have the **most volume**.
- Material (2) has the **most volume** although it doesn't have the **most mass**.
- Material (3) is the longest one.



Check your understanding

- ▶ Based on the data in the table, choose the correct answer :

Material	Mass (g)	Volume (mL)
 Plastic ruler	30	115
 Iron cube	200	20

- The plastic ruler contains **less** matter than the iron cube.
a. more b. equal c. less
- The iron cube takes up **less** space than the plastic ruler.
a. more b. equal c. less

In the Assessment Book :

Try to answer :

Self-Assessment (27)

Exercises on Lesson 3

● Understand

● Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. Which of the following matter is attracted to the magnet ? ...
☐ Ice cube. ☐ Paper clip. ☐ Woody spoon. ☐ Plastic ruler.
2. Which of the following matter floats on the surface of water ? ...
☐ Iron spoon. ☐ Piece of stone. ☐ Iron nail. ☐ Piece of cork.
3. Which of the following matter sinks and not attracts to the magnet ? ...
☐ a. Wood cube. ☐ Iron nail. ☐ A piece stone. ☐ Plastic cup.
4. The mass of an orange will change if we change its
☐ a. size only. ☐ b. shape only.
☐ c. size and shape. ☐ d. color and shape.
5. If we cut a tomato into two halves, the of one half of tomato will decrease to half.
☐ a. color ☐ b. mass ☐ c. temperature ☐ d. shape
6. A one kilogram of tomato is differ from one kilogram of wood in the
☐ a. volume only. ☐ b. mass only.
☐ c. volume and mass. ☐ d. color and mass.

Put (✓) or (X) :

1. Iron spoon is attracted to the magnet. ()
2. Iron nail is attracted to the magnet and floats on the surface of water. ()
3. If we put a wood cube in water it will float. ()
4. If we cut an apple into 4 pieces, the mass of each piece is less than the mass of whole apple. ()
5. If the masses of two different materials are equal, so their volume must be equal. ()
6. The mass of iron bar its volume equals 50 cm^3 is differ from the mass of wood bar has the same volume. ()

Complete the following sentences using the words below.

(mass – iron – attracted – doesn't attract – cotton – floats – sinks)

1. A spoon of wood to the magnet and on the surface of water.
2. An iron ruler in water, and to the magnet.
3. If you eat a small piece from a banana, so the of the remained piece of banana will decrease.
4. If an iron cube and an amount of cotton have the same mass, so the volume of is smaller than that of the

4 What happens if ... ?

1. A magnet is put close to an iron nail and a plastic spoon.

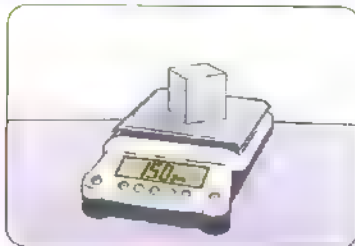
.....

.....

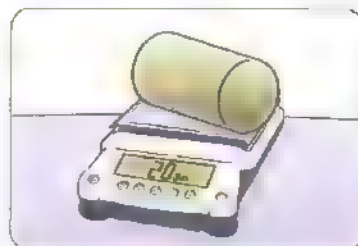
2. A piece of cork is put in water.

.....

Look at the following figures, then choose the correct answer



Material (A) Iron cube



Material (B) Piece of cork

1. Material has the largest volume.
(A – B)
2. Material has the largest mass.
(A – B)
3. Material is attracted to the magnet.
(A – B)
4. Material floats on the surface of water.
(A – B)

LESSON

4

Activity 11 Useful Properties of Matter

► Look at the following picture, then put (✓) or (x) .

1. Cooking pans are made up of copper. ()
2. Handles of cooking pans are made up of wood or plastic. ()



► In this activity we will learn about the useful properties of some materials.



Properties of helium

Physical properties

It is a **light gas** which means it is lighter than air.

Chemical properties

- It is **not poisonous**.
- It is **not flammable** (A flammable material means that this material burns and form fire).

Uses of helium

It is used to fill balloons



It is used to fill blimps



Give reason for :

Balloons and blimps filled with helium always rise up in the air.
Because the helium is lighter than air.



Note

As helium is not flammable or poisonous, so it is a gas that can be used safely.

Physical properties

- It can be stretched into thin, flexible wires.
- It conducts electricity well (good conductor of electricity).
- It conducts heat well (good conductor of heat).

The ability of material to transfer heat and conduct electricity.

Uses of copper

It is used in making electrical wires



It is used in making cooking pans



? Give reason for :

Electric wires are made up of copper.

Because copper is a good conductor of electricity and can be stretched into a thin, flexible wire.

Note

Wood and plastic are bad conductors of heat so, they can be used in making handles of cooking pans.



Check your understanding

► Look at the following figures, then answer the questions :



Figure (a)



Figure (b)

1. In which figure the hand will feel heat.
2. The cooking pan is made up of

(Figure (a) – Figure (b))
(wood – copper)

Activity 12

Uses of Matter

- ▶ You have learned alot about the properties of a materials.
Now, we will learn about some uses of some other matter.
- ▶ The following table shows some uses of some matter and its properties.

Types of Matter	Uses (purpose)		Property
	 Screwdrivers	 Hammers	<ul style="list-style-type: none"> • Hard. • Strong.
	 Windows	 Eyeglasses	<ul style="list-style-type: none"> • Transparent. • Smooth.
	 Tires  Athletic shoes	 Gloves	<ul style="list-style-type: none"> • Water proof. • Flexible.



Check your understanding

- ▶ Complete the following sentences :

1. Among the properties of rubber are water proof and
2. Hammers are made up of

steel
hammers
athletic shoes

مكاب
مطارق
أحذية رياضية
screwdrivers
tires
rubber

مفكاب
إطاراب
المطاط

In the Assessment Book :

Try to answer
Self-Assessment (28)

Exercises on Lesson 4

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

1. Helium is lighter than air, this property is considered as .
 - a. a physical property only.
 - b. a chemical property only.
 - c. both physical and chemical property.
 - d. neither physical nor chemical property.
2. When you put a lighting match close to helium gas, it will
 - a. burn.
 - b. not burn.
 - c. form fire.
 - d. freeze.
3. Blimps are filled with to rise up in the air.
 - a. oxygen gas
 - b. carbon dioxide gas
 - c. atmospheric air
 - d. helium gas
4. If you touch the end of the copper bar shown in the figure, you will feel hot because copper is
 - a. good conductor of electricity.
 - b. bad conductor of electricity.
 - c. good conductor of heat.
 - d. bad conductor of heat.
5. All the following are from physical properties of copper, except that
 - a. it is good conductor of electricity.
 - b. it is good conductor of heat.
 - c. it can be stretched into thin wires.
 - d. it is lighter than air.
6. We can use copper to make
 - a. handles of cooking pans.
 - b. body of cooking pans.
 - c. gloves.
 - d. tires.
7. Steel is used in making hammers, because it is
 - a. flexible.
 - b. smooth.
 - c. hard.
 - d. transparent.
8. Glass is transparent, so it can be used in making
 - a. eyeglasses.
 - b. tires.
 - c. screwdrivers.
 - d. gloves.
9. Rubber is used to make all the following, except
 - a. athletic shoes.
 - b. gloves.
 - c. tires.
 - d. windows.



(A) Matter	(B) It is used to	(C) Because it is
1. Copper	a. make eyeglasses.	A. strong.
2. Helium	b. make tires.	B. good conductor of electricity.
3. Rubber	c. make hammers.	C. transparent.
4. Glass	d. fill balloons.	D. lighter than air.
5. Steel	e. make electrical wires.	E. flexible.

1. _____ → _____ 2. _____ → _____ 3. _____ → _____
 4. _____ → _____ 5. _____ → _____

Put (✓) or (X) :

1. From the chemical properties of helium is that it is not flammable. ()
2. Helium is a gas that can be used safely, because it is poisonous. ()
3. When a balloon is filled with helium, it will fall down on the ground. ()
4. Copper is used in making cooking pans because copper is good conductor of electricity. ()
5. Handles of cooking pans are made of wood or plastic because they are bad conductor of heat. ()
6. Glass is used in making windows, because the glass is a transparent material. ()
7. Rubber is very hard, so it is used in making athletic shoes. ()
8. Hammers must be very strong, so they are made of steel. ()

1. It is a light gas which is used in filling blimps. (.....)
2. The ability of material to transfer heat and conduct electricity. (.....)
3. A matter which is used in making gloves because it is waterproof and flexible. (.....)

Complete the following sentences :

1. Helium is not flammable, this property is considered as property.
2. We can use gas to fill blimps, because it is lighter than
3. Helium is not or, so it is considered as a safe gas.
4. The ability of copper to be stretched, is from properties of copper.
5. Cooking pans can be made of copper because it is good conductor of, while electrical wires can be made of copper because it is good conductor of

6. The body of can be made from copper, while its handles is made from or plastic.
7. We can use in making hammers because it is and
8. As is a waterproof material, we can use it in making gloves.
9. Glass is used in making windows and eyeglasses, because glass is and

Give reasons for :

- 1. Helium is used to fill balloons and blimps.

- 2. Human can use helium gas safely.

- 3. Wood and plastic are used in making handles of cooking pans.

What happens if ... ?

1. A blimp is filled with helium gas.

2. Electrical wire is made from plastic instead of copper.

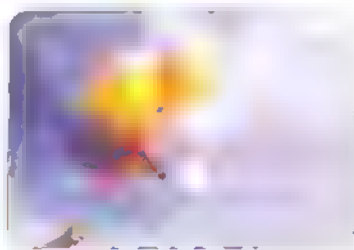
Look at the following pictures and think :

- making this tools using the words below :

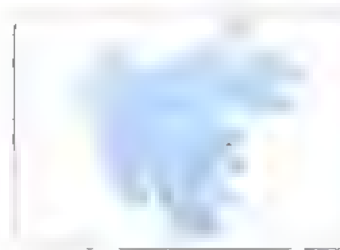
(Rubber – Copper – Glass – Helium – Steel)



1.



2.



3.



4.



5.

Activity 13 Record Evidence Like A Scientist

- In this concept, you have learned a lot about matter and how describing and measuring it.
- Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

Step 1 The Question

How is matter described and measured ?

Step 2 My Claim

Step 3 My Evidence

Step 4 My Scientific Explanation

Activity 14 STEM IN ACTION

- Look at the following picture, then answer the question :

To measure the length of this fish we can use

(ruler – balance – measuring cup)



Careers and Measuring Matter

- You have learned in the previous lessons how to measure some different materials.
- In this activity we will learn about the importance of measuring matter in different careers or jobs.

Architects and builders

- They carefully measure materials when building homes and schools because they must know correct lengths and widths of boards before building walls.
- Knowing the properties of materials and the correct measurements help architects and builders to build up safe buildings.



Bakers

Bakers must measure the volume and mass of ingredients before start baking.



Example :

If too much or too little baking powder is used in baking a cake, the bakers could not make a good cake.



Scientists often measure matter during their researches.

- The following table shows some measurements that different scientists do :

Paleontologists	Space scientists	Marine biologists
Measure the size and shape of fossils.	Measure the mass of planets and stars.	Measure the speed of sound produced from animals such as whales and dolphins.
		

Note

Scientists must use accurate measurements when they do experiments or researches.

Cartographers

- They are responsible for measuring and mapping Earth's surface.
- Maps can give us information about climate and topography (that studies mountains, lands, seas, oceans, ... etc. on the Earth's surface).



The role of cartographers :

1. They create city maps to help tourists find their way.



paleontologists
space scientists
marine biologists
whales

علماء الحفريات
علماء الفضاء
علماء الأحياء البحرية
حيتان

accurate
cartographers
researches

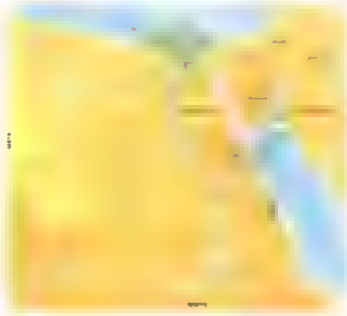
دقيق
رسماء الخرائط
الابحاث

fossils
stars
tourists

حفريات
نجوم
السياح

2. They use information and photos from satellites to create maps of :

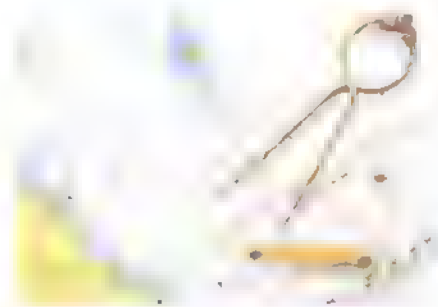
• The Earth's surface



• The moon's craters



3. They create marine charts to guide ships through dangerous water.



Check your understanding

► Put (✓) or (x) :

1. Architects and builders don't measure materials when they build homes. ()
2. Paleontologists measure the size and shape of fossils. ()
3. Biologists develop city maps to help tourists find their way. ()

In the Assessment Book :

Try to answer

- Self-Assessment (29)
- Model Exam on Concepts (2.1 & 2.2)

Activity 15 Revising: Describing and Measuring Matter

► We can summarize this concept in the following main points :

- Desert home is made of strong stones.
 - Cold weather home is made of ceramic tiles.
 - Tropical rainforest home is made of leaves and sticks.
-
- Matter can be described by its color, shape, odor, texture and size.
-
- Measuring cup is used to measure the volume of matter.
 - Ruler and tape measure are used to measure the length of matter.
 - Balance is used to measure the mass of matter.
 - Thermometer is used to measure the temperature of matter.
-
- Physical properties of matter are :
 - Color
 - Shape
 - Odor
 - Texture
 - Chemical properties of matter are :
 - The ability to burn.
 - The ability to rust.
-

Volume :

It is the amount of space that matter takes up.

Mass :

It is a measure of the amount of matter.

- Floating and sinking of substances don't depend on its mass.
 - Changing the shape of material doesn't affect its mass.
-

Helium is used to fill balloons and fill blimps.

Copper is used in making electrical wires and cooking pans.

Conduction :

The ability of material to transfer heat and conduct electricity.

- Wood and plastic are bad conductors of heat so, they can be used in making handles of cooking pans.
-
- Scientists must use accurate measurements when they do experiments or researches.



- 1

分

4. Marine biologists can measure the speed of dolphin sound under the surface of water. ()
5. Space scientists can't measure the mass of stars in the space. ()
6. Cartographers create marine charts to help tourists find their way during their trip. ()
7. Cartographers use photos that are received from satellites to create maps of the moon's craters. ()

Give reasons for the following statements:

1. The tool that is used by bakers to measure the volume of water during making bread. ()
2. The scientists who measure the size and shape of fossils. ()
3. They are responsible for measuring and mapping Earth's surface. ()
4. It is a tool which can give us information about climate and topography. ()

Complete the following sentences using the words given:

(experiments – volume – length – satellites – speed – fossils)

1. To build a house, architects must measure the _____ and width of walls before building walls.
2. Bakers use the measuring cup to measure the _____ of oil during making cakes.
3. Marine biologists can measure the _____ of sound of whales in oceans.
4. Paleontologists must measure the size and shape of _____ to identify them.
5. Measurements of scientists must be accurate during doing their _____.
6. Cartographers use information that are received from _____ to create maps of the Earth's surface.

Give reasons for :

1. Architects and builders use tape measure in their work.

2. Bakers use balances and measuring cups in their work.

- 3. Cartographers create city maps.



Figure (A)

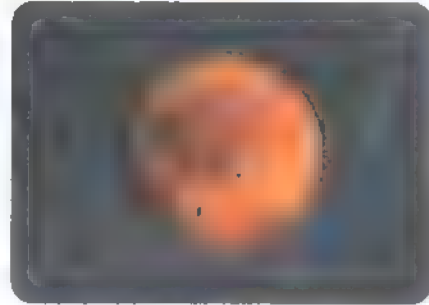


Figure (B)



Figure (C)



Figure (D)

1. The tool in figure (A) is used by
(architects – builders – bakers)
2. The mass of mars planet in figure (B) is measured by
(paleontologists – space scientists – marine biologists)
3. The tool in figure (C) is used by
(builders – cartographers – bakers)
4. The map in figure (D) is made by
(paleontologists – builders – cartographers)

Model Exam in Concept (2.2)

Total mark

20

- All the following are physical properties of matter, except ...
 a. color. b. rusting. c. texture. d. shape.
- Homes which are built in a cold weather area have roofs made up of
 a. ceramic tiles. b. strong stones.
 c. carton paper. d. leaves and sticks.
- Scientists which measure the size and shape of fossils during their research are.....
 a. cartographers. b. space scientists.
 c. marine biologists. d. paleontologists.
- The mass of an orange will change if we change its .
 a. size only. b. shape only.
 c. size and shape. d. color and shape.

(B) Give a reason for the following :

Human can use helium gas safely.

(temperature – chemical – climate – mass)

- Helium is not flammable, this property is considered as property.
- By decreasing the speed of particles of a matter its will decrease.
- We can use different materials to make a roof, depending on the where the home is located.
- If you eat a small piece from a banana, so the of the remained piece of banana will decrease.

- They are responsible for measuring and mapping Earth's surface. (.....)
- The properties of matter which you can observe them by using your five senses. (.....)

(A) Put (✓) or (X) :**(5 marks)**

1. Rubber is very hard, so it is used in making athletic shoes. ()
2. 1 Kilogram of water has a volume equals 1000 milliliters. ()
3. The scientists who measure the speed of dolphin sound under the sea surface are paleontologists. ()
4. You can use thermometer to measure the temperature of a hot cup of tea. ()

(B) What happens if ... ?

A magnet is put close to an iron nail and a plastic spoon.

.....

(A) Choose the correct tool to measure the following:

(A)	(B)
1. Thermometer	a. is used to determine the length of a book.
2. Ruler	b. is used to determine the mass of some apples.
3. Measuring cup	c. is used to determine the temperature of some ice cubes.
4. Balance	d. is used to determine the volume of an amount of water.
	e. is used to determine the shape of a book.

1.
2.
3.
4.

(B) Tool which is used in making this tools :

1.



2.

Concept

2.3

Comparing Changes in Matter



r

Learning outcomes

By the end of this concept, your child will be able to :

- Explain the relationship between changes in temperature, states of matter and mass.
- Identify the causes of changes in the physical and chemical properties of matter.
- Investigate what happens when two or more substances are mixed.
- Classify mixtures and compounds based on what happens when they are combined.

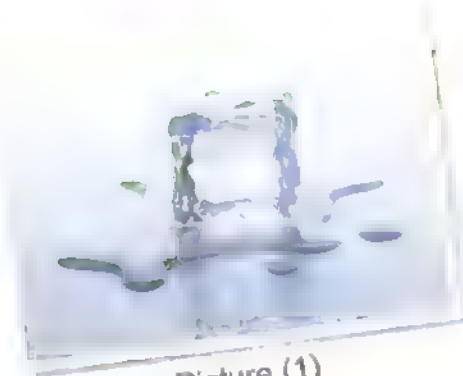
Key vocabulary

- | | |
|-----------------------|------------|
| • Chemical change | • Energy |
| • Chemical properties | • Friction |
| • Compound | • Heat |
| • Physical change | • Light |
| • Thermal energy | • Melt |
| • Water vapor | • Mixture |

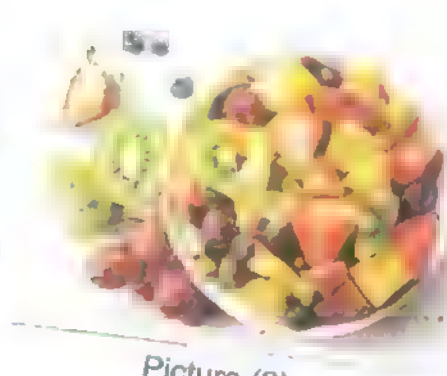
Notes For Parents On Concept 2.3

Lessons	Activities	What you should do with your child
1	Activity 1	Explain to your child what happens to the mass of a matter when it is heated, cooled or mixed with other substances.
	Activity 2	Discuss with your child about the meaning of melting matter
	Activity 3	Let your child think about how to differentiate between the states of matter.
	Activity 4	Explain to your child how the motion of the particles of a matter is related to the thermal energy of this matter.
2	Activity 5	Explain to your child how gaining or releasing energy affects on the states of matter.
	Activity 6	Discuss with your child that the temperature of the matter affects on the state of the matter
3	Activity 7	Explain to your child how changing of states of matter happens.
	Activity 8	Let your child think about the meaning of the mixtures and some examples of mixtures.
	Activity 9	Discuss with your child about the difference between mixture and compound
4	Activity 10	Explain to your child how the masses of substances do not change after mixing with other substances even if there are changes in their properties
5	Activity 11	Let your child think about the properties of mixtures.
	Activity 12	Let your child think about the meaning of the physical changes and some examples of the physical changes.
	Activity 13	Discuss with your child the meaning of the chemical changes and some examples of the chemical changes.
6	Activity 14	Explain to your child how chemical changes affect the substances producing new substances with new properties.
	Activity 15	Explain to your child that we can differentiate between chemical and physical changes using some evidences.
7	Activity 16	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
	Activity 17	Let your child think about how important the desalination is and how it helps people to survive.
	Activity 18	Let your child review the main points in this concept.

Activity 1 Can You Explain?



Picture (1)



Picture (2)

- In the previous concepts, you have learned that there are different states of matter and each matter takes up space and has mass.
- Also, you have learned that each matter has its own physical and chemical properties.
- The pictures above show that matter can be changed to different states as in picture (1) and matter can be mixed with other matter.

► What happens to the mass of a matter when it is heated, cooled or mixed with other substances ?

- The mass of any matter does not change when it is heated, cooled or mixed with other matter such as :
 - In picture (1), when ice cubes is heated and changed to water, the mass does not change.
 - In picture (2), the mass of any of the fruits before mixing with other fruits is the same after mixing with other fruits.

► In this concept, we will study :

- Temperature and state of matter.
- Mixtures.
- Properties of mixtures.
- Physical changes in our lives.
- Chemical changes.

Activity 2 Melting Matter

► Put the suitable word from those between brackets under the suitable picture :

(Liquid – Gas – Solid)



..... state



..... state

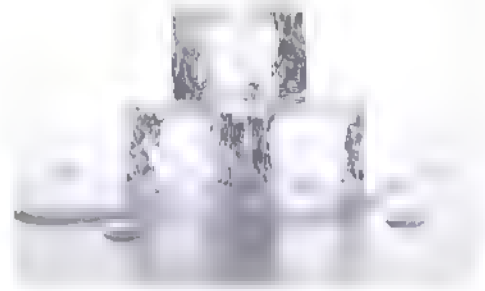


..... state

- Water is a matter that can be found in the three states of matter which are solid, liquid and gas state.
- Imagine that you forget a bowl contains ice cubes in a hot place, you will find water in the bowl instead of ice cubes. That means the ice **melts** and it is turned into water.

Melting :

It is a process in which a matter is changed from solid to liquid state when its temperature increases (by heating).



Note

Solid matter should be kept below certain temperature to stay in solid state.



Check your understanding

► Complete :

1. Ice is the state of water.
2. Melting is the change of matter from state to state by heating.

► Put (✓) or (x) :

1. Water vapor is the solid state of water. ()
2. When water melts, it is changed from liquid state to solid state. ()

Activity 3**What Do You Already Know About Changes To Matter?**

- Matter can be found in solid, liquid or gas state which we can differentiate between them by identifying their properties such as :

Solids

- They have definite volumes.
- They have definite shapes.
- They are hard.

Liquids

- They have definite volumes.
- They don't have definite shapes but they take the shapes of their containers.



- They don't have definite volumes but they take the volume of their containers.
- They don't have definite shapes but they take the shapes of their containers.

- Matter can be changed from one state to another without any change in its amount so there is no change in the total number of particles of the matter during the change of the state of matter.

**Check your understanding****► Choose :**

- During the change of the state of matter, the amount of the matter
 - increases.
 - decreases.
 - stays the same.
- When a liquid matter is changed to a gas, the total number of its particles
 - does not change.
 - decreases.
 - increases.
- The ice cubes are solid because they
 - are hard.
 - don't have definite volumes.
 - don't have definite shapes.

Activity 4 Particles

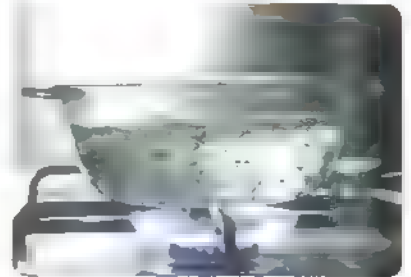
Thermal energy

- Thermal energy is not a physical thing (material) but it is an energy in the form of heat.
- We use thermal energy every day in many things such as cooking food and warming homes.
- The thermal energy from the Sun keeps living things on the Earth alive.



Particles in motion

- Any matter is made up of very small particles.
- Particles in matter are always in motion state even in solids that their particles are close together.
- Particles in matter have energy that make them able to move, vibrate and spin around.
- When particles of a matter absorb more thermal energy, they move, vibrate and spin around faster that causes this matter becomes warmer.



Notes

1. When particles are cooled down, particles move slower and come close together.
2. When particles are warmed, they move faster and spread out.
3. Light energy is like thermal energy when particles of a matter absorb them, particles move, vibrate and spin faster.



Check your understanding

► Put (✓) or (x) :

1. Thermal energy is a matter. ()
2. Particles in solid are not moving. ()
3. When particles are warmed, they move slower and come close together. ()
4. When particles absorb thermal energy, they move faster and spread out. ()

In the Assessment Book :

Try to answer

Self-Assessment (30)

physical thing
warmer
vibrate
spread

شيء مادي
أدفأ
يهتز
ينتشر
motion state
come close
absorb

حالة حركة
يقرب
يمتص
spin
light energy
faster

يدور
طاقة ضوئية
أسرع

Exercises on Lesson 1

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- 1. When ice melts, it turns from state to state.
☐ liquid – solid ☐ solid – liquid ☐ liquid – gas ☐ solid – gas
- 2. When ice kept in a cold temperature, it
 a. turns into water. b. turns into steam.
 c. remains as it is. d. becomes unclear.
- 3. Ice can turn into water by
 a. cooling. b. freezing. c. rusting. d. heating.
- 4. Which of the following matter has a definite volume and shape ?
 a. Water. b. Milk. c. Ice. d. Air.
- 5. Which of the following matter takes the shape of container but has a definite volume ?
 a. Milk. b. Ruler. c. Water vapour. d. Apple.
- 6. Which of the following matter takes the shape and the volume of the container ?
 a. Water. b. Juice. c. Ice. d. Water vapour.
- 7. When the water is heated, its particles
 a. move slower. b. move faster.
 c. move with the same speed. d. do not move.
- 8. All the following happen to the particles of oil when it is cooled, except that they ...
☐ move slower. ☐ move faster. ☐ vibrate less. ☐ come close together.
- 9. When we heat a liquid, the distance between its particles will
 a. decrease. b. increase.
 c. not be affected. d. become zero.
- 10. Which of the following matter its particles are very close together ?
 a. Oxygen gas. b. Water. c. Oil. d. Wood.

Choose from columns (B) what suits it in column (A) :

(A)	(B)
1. Oxygen gas	a. has a definite volume and shape.
2. Oil	b. has a definite shape, but it doesn't have a definite volume.
3. A piece of rock	c. has a definite volume, but it doesn't have a definite shape.
	d. doesn't have a definite volume and shape.

1.

2.

3.

Put (✓) or (X) :

1. The mass of an amount of apple juice will change if we mix it with water. ()
2. The mass of some pieces of ice will be the same when they are melted. ()
3. An ice cream turns into liquid by cooling. ()
4. If we increase the temperature of some pieces of ice, they will melt. ()
5. Water is considered as a liquid matter because it has definite shape and volume. ()
6. Carbon dioxide gas doesn't have definite shape and volume. ()
7. When particles of a matter absorb thermal energy, they move slower. ()
8. If a matter absorbs light energy, its particles vibrate and move faster. ()
9. Particles of solid matter are spread out from each other. ()

Write the scientific term of each of the following :

1. It is a process by which a matter is changed from solid to liquid state. (.....)
2. The state of matter in which matter has definite volume and shape. (.....)
3. The state of matter in which matter has definite volume and takes the shape of its container. (.....)
4. The state of matter in which matter takes the volume and the shape of its container. (.....)

Complete the following sentences :

1. When we heat an ice cream, it and becomes liquid.
2. Melting process occurred by the temperature of the matter.
3. When we keep some of ice cubes in a low temperature, they don't
4. When ice is melted, it is changed from state to state.
5. Iron is a state of matter that has definite and

6. The state of matter which has definite volume and take the shape of container is the state of matter.
7. Air is considered as an example of state, because it takes the and the of container.
8. The distance between particles of solid matter is very
9. When an amount of a liquid is heated, the speed of its particles will

6 Give reasons for the following

1. Ice is turned into water when it is placed in a warm room.

2. Juice is considered as a liquid state of matter.

3. Air doesn't have a definite volume or shape.

7 What happens if ... ?

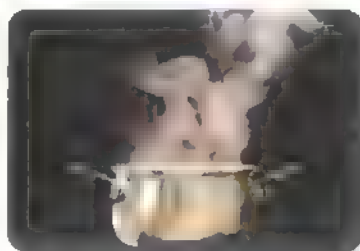
1. We cool some of tomatoes. (according to their masses).

2. We increase the temperature of some ice cubes.

3. We heat an amount of water. (according to the motion of particles).



Picture (1)



Picture (2)



Picture (3)

1. Picture (.....) is considered as a solid matter because
2. Picture (.....) is considered as liquid matter because
3. Picture (.....) is considered as gas matter because
4. Picture (.....) $\xrightarrow[\text{Process}]{\text{Melting}}$ picture (.....).

► Put (✓) or (x) :

1. Matter cannot be changed from one state to another. ()
2. When heating ice cubes, they will melt. ()

► In the following experience, you can see that matter can change its state due to change in its temperature.

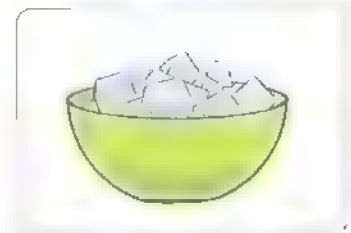
► Tools



Plastic bag



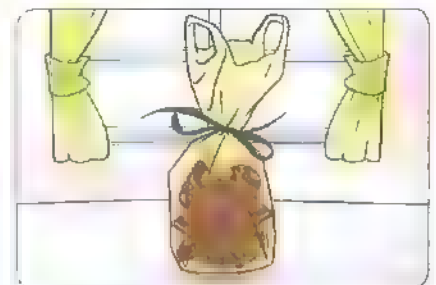
Small pieces of chocolate



Ice cubes in a bowl

► Steps

1. Put the small pieces of chocolate in the plastic bag and close the bag.



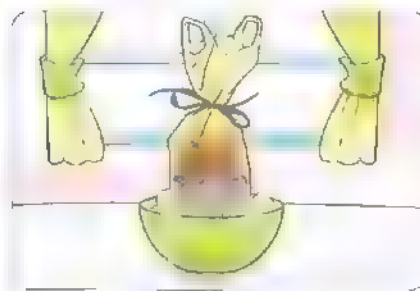
2. Put the plastic bag in the Sun rays for 15 minutes, then notice what happen to the chocolate pieces.



► Observations

- The chocolate pieces are changed from solid state to liquid state.
- The small pieces are changed to liquid state faster than the big pieces.

3. After the chocolate melts, put the plastic bag on the bowl of ice cubes for about 20 minutes and notice what happens to the chocolate.



► Observation

The liquid chocolate is changed to a piece of solid chocolate.

► Conclusion

Matter can be changed from one state to another by changing its temperature where :

- When a solid matter is heated up, it is changed to liquid matter.
- When a liquid matter is cooled, it is changed to solid matter.

💡 Note

Each matter has thermal energy and when the thermal energy changes, it affects the state of the matter where the matter can be changed from one state to another by **gaining** (taking) or **releasing** (losing) energy.



Check your understanding

► Put (✓) or (x) :

1. When solid matter are heated up, they are changed to liquid matter. ()
2. The thermal energy affects the state of matter. ()
3. Liquid matter can be changed to solid matter by heating. ()

Activity 6 Temperature And State of Matter

- You have learned that the temperature is a measure of how quickly the particles in a substance are moving.

So, the temperature measures how much energy the particles in a substance have.

Physical change

It is a change in matter without any change in its structure (makeup).

Example : When melting chocolate, its taste, color and smell don't change.

- Physical changes are usually reversible such as melting is the reverse process of freezing.



Temperature and states of matter

- Changes of states of matter are often effected by the changes in temperature of matter which cause changes in energy of particles of that matter.

- In melting process, the particles of a solid matter gain energy and they move around more and their temperature increases so, the matter changes to liquid.



- In freezing process, the particles of a liquid matter release energy and they move slower and their temperature decrease so, matter changes to solid.

Example :

- When the temperature of solid water increases above 0°C , its particles gain energy and they move around more so, solid water changes to liquid water.
- When the temperature of liquid water decreases below 0°C , its particles release energy and they move slower so, liquid water changes to solid water.



 **Notes**

1. 0°C is known as the freezing point of water.
2. $(^{\circ}\text{C})$ is the measuring unit of temperature.



Check your understanding

► **Complete :**

1. In freezing process, the particles of a liquid release energy and their temperature ...
2. The changes in matter that do not change the structure of the substance are called ... changes.

► **Put (✓) or (X) :**

1. The temperature of matter does not affect the state of matter. ()
2. In melting process, the particles of a liquid matter gain energy. ()

In the Assessment Book :

Try to answer :

Self-Assessment (31)

Extension on Lesson 2

● Understand

○ Apply

● Analyze

● Evaluate

● Create

Choose the correct answer :

- Freezing of liquid chocolate needs temperature.
a. high b. low c. warm d. very high
- When ice cubes gain energy, they turn into water.
a. sound b. potential c. electrical d. thermal
- Physical changes of matter include
a. melting only. b. freezing only.
c. both melting and freezing. d. neither melting nor freezing.
- Increasing the temperature of a matter means that its particles
a. have low energy. b. have high energy.
c. have very low energy. d. don't have energy.
- The reversible changes of matter are usually
a. physical changes only.
b. chemical changes only.
c. both physical and chemical changes.
d. neither chemical nor physical changes.
- In freezing process, the particles of matter lose energy and
a. move with high speed. b. move with very high speed.
c. move with low speed. d. don't move.
- Ice is turned into when its temperature is between 0°C and 100°C .
a. solid state b. liquid state c. gas state d. water state
- When the temperature of water is decreased below 0°C , it will be turned into
a. water vapor. b. clear water. c. colored water. d. ice.

Put (✓) or (X) :

- When ice is heated, it will freeze. ()
- When a solid matter gains thermal energy, it will change into liquid state. ()
- Freezing takes place by cooling, while melting takes place by heating. ()
- Increasing temperature means that particles of matter have low thermal energy. ()

5. Melting and freezing are reversible processes. ()
6. When the particles of matter move with high speed, its temperature will decrease. ()
7. Water remains liquid between 0°C and 100°C . ()
8. Freezing means that matter changes from solid state to liquid state. ()

1. They are changes in matter which are usually reversible and don't affect its structure. ()
2. It is the process by which the particles of matter gain energy and changes from solid to liquid state. ()
3. It is the process by which the particles of matter lose energy and changes from liquid to solid state. ()
4. The state of water when its temperature is between 0°C and 100°C . ()

(freezing – increase – water – temperature – decrease – particles – melting)

1. When a chocolate cube is exposed to sun rays, its temperature will and it will become liquid.
2. Matter can be changed from one state to another by changing its
3. When we put a bottle containing water in freezer its temperature will and becomes solid.
4. Solid state is turned into liquid state by process.
5. Liquid state is turned into solid state by process.
6. By changing the temperature of matter, its speed will change.
7. 0°C is the freezing point of

Give reasons for :

1. When the temperature of ice cubes increases, they will melt.
.....
2. Both melting and freezing processes are considered as physical changes.
.....

5 What happens to ... ?

1. The particles of water when its temperature is decreased below 0°C .

2. A piece of chocolate if it is exposed to sun ray for a period of time.

6

melting and freezing processes :



Picture (A)



Picture (B)



Picture (C)



Picture (D)

1. During melting process, picture (.....) changes into picture (.....) with the help of picture (.....).
2. During freezing process, picture (.....) changes into picture (.....) with the help of picture (.....).

Activity 7

What's the Matter ? Changing States

► Put (✓) or (x) :

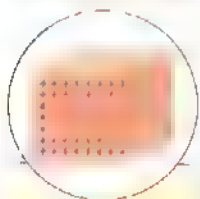
1. The thermal energy affects on the movement of particles of matter. ()
 2. Melting and freezing are reversible processes. ()
- You have learned that matter can be changed from one state to another if its temperature changes.
 - We will study changing of states that happen in water as an example of changing of states of matter.

Changing a solid to a liquid (Melting)

When placing a container of ice cubes on a hot stove, the ice gains thermal energy so, the particles move faster and separate that causes the change of the ice from solid state to liquid state.



Particles of ice



Particles of water

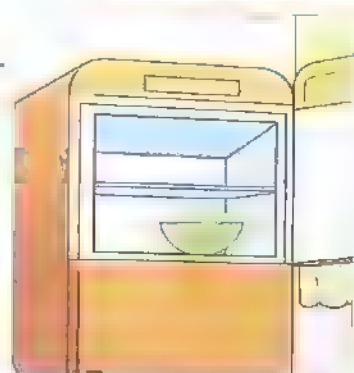


Heating →

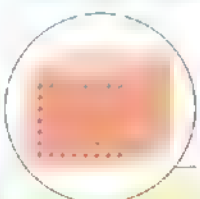


Changing a liquid to a solid (Freezing)

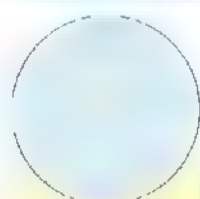
When placing a water container in a freezer, the thermal energy of liquid water is transferred to the space in the freezer so, the particles move slower and get close together that causes the change of the water from liquid state to solid state (ice).



Particles of ice



Particles of water

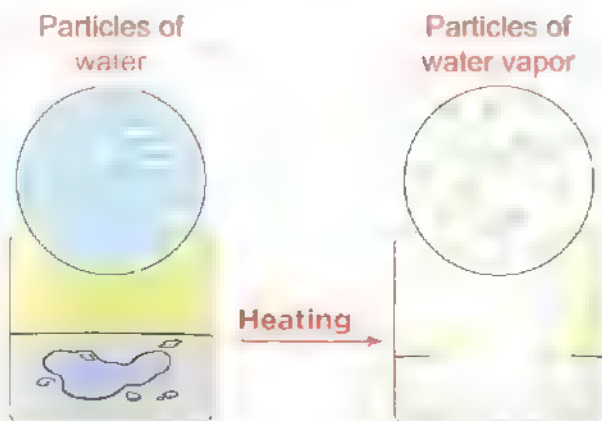


← Cooling



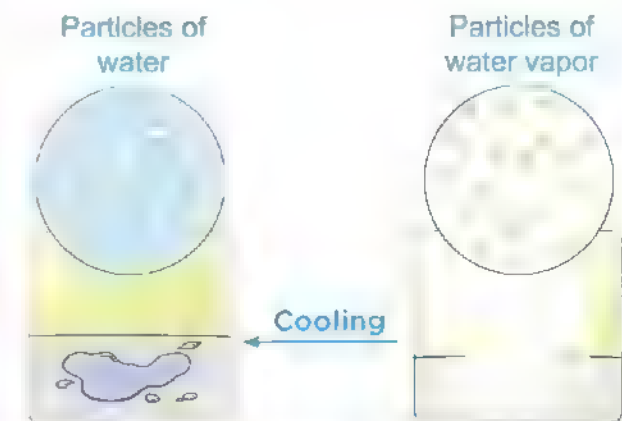
Changing a liquid to a gas (Evaporation)

When boiling a water container on a hot stove, the water gains thermal energy so, the particles move faster and spread more that causes the change of the water from liquid state to water vapor. After the hot water vapor hits the cooler air, it condenses into tiny water droplets forming a small cloud (steam).



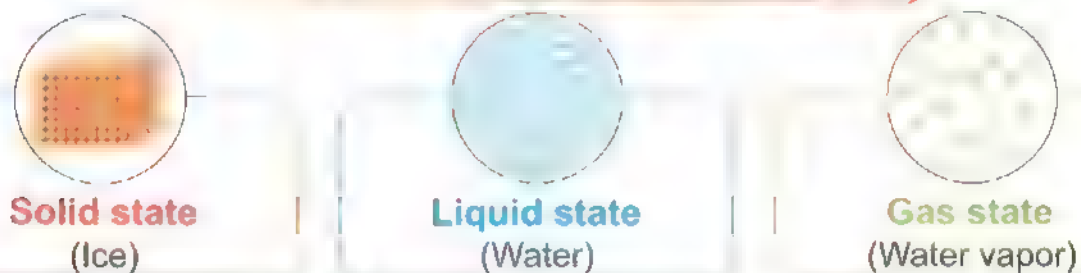
Changing a gas to a liquid (Condensation)

When water vapor touches a cold lid, the thermal energy of the water vapor is transferred to the cold lid so, the particles move slower and get close together that causes the change of the water vapor from gas state to liquid state.



► We can summarize the previous in the following diagram :

Heating (particles of water gain energy)



Cooling (particles of water release energy)



Check your understanding

► Put (✓) or (x) :

1. When changing water into ice, we heat water. ()
2. Heating of water can change it into water vapor. ()

evaporation
lid
summarize

تبخير
غطاء
يلخص
condensation
cloud

تبخير
محاوية
condense
tiny

يتكثف
صغير

Activity 8 Real-World Mixtures



- In our world, we can see some matter that are formed of mixing or combination of some materials together forming "mixtures" like those in the pictures above.

Examples of mixtures

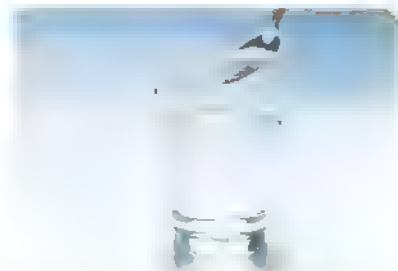
• Some types of food (salads) :

If you mixed some fruits (solid matter) together you form salad which is a mixture.



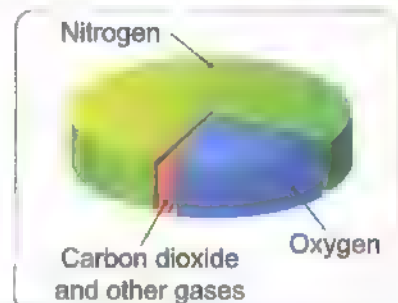
• Salty water :

When you dissolve some salt (solid matter) in water (liquid matter), they form salty water which is a mixture.



• Atmosphere :

Atmosphere or air is the most important mixture in our life which is formed of some gases mixed together such as nitrogen, oxygen, carbon dioxide and other gases.



Check your understanding

► Put (✓) or (x) :

1. Mixture is a matter that consists of one material.
2. Salty water is a mixture.

()
()

Activity 9 Mixtures

- Most things in nature are " ", but there are other things in our world known as "Compounds".

Mixtures and Compounds

- A mixture is a matter formed of two or more materials.

them does not change them into new substances.

- A compound is a matter formed of two or more materials.

new substance

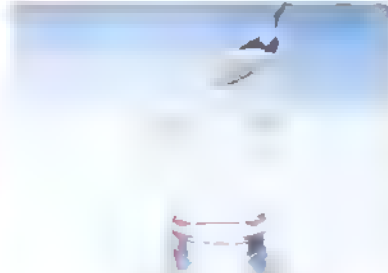
- Mixtures can be made of :

Solid materials



Sand and rocks

Solid and liquid materials



Salty water

Gas materials



Air

Note

The components in many mixtures are difficult to be seen without special equipment such as mixture of gases.

Properties of mixture

- It consists of two or more materials.
- All materials that form a mixture don't combine chemically.
- Each material in a mixture keeps its properties that you can use to identify it such as :
 - Sugar does not lose its sweetness when it is dissolved in water.
 - In fruit salad, you can identify each type of fruit in the fruit salad.
- The components of a mixture can be separated after mixing them.

Separating mixtures

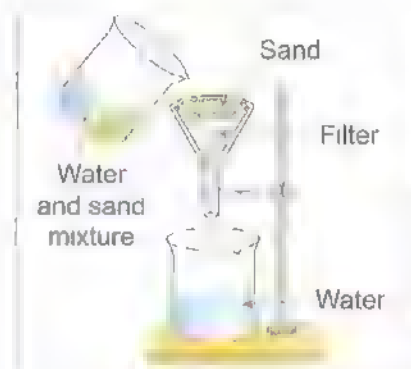
There are many methods to separate the components of mixtures such as :

Filtration :

A filter can be used to separate a mixture if one material in the mixture has smaller particles than the particles of other materials.

Example :

Separating sand from a mixture of water and sand.

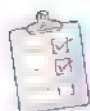
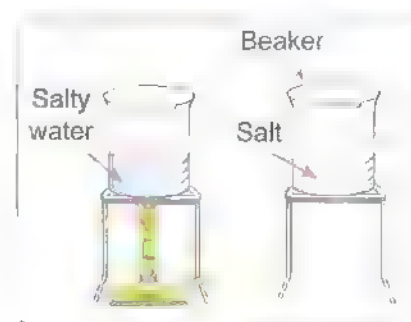


Evaporation :

Evaporation can be used to separate materials that evaporate at different temperature.

Example :

Separating the salt from a mixture of salty water by heating the salty water, the water will evaporate leaving the salt in the beaker.



Check your understanding

► Complete using the words between brackets :

(solid – compound – filters)

1. The matter that is formed of two materials or more that are combined chemically is called
2. We can use to separate mixtures that one material has smaller particles than the others.
3. Sand and rocks is a mixture that is made of materials.

In the Assessment Unit

Try to answer :

Self-Assessment (32)

Exercises on Lesson 3

● Understand

○ Apply

● Analyze

● Evaluate

● Create



Choose the correct answer :

1. Physical processes which need heating include
 - a. melting and freezing.
 - b. melting and condensation.
 - c. melting and evaporation.
 - d. freezing and evaporation.
2. The two processes which cause particles of matter get close together are
 - a. freezing and condensation.
 - b. freezing and melting.
 - c. freezing and evaporation.
 - d. melting and condensation.
3. To change water from solid state to liquid and then to gas state, we need to
 - a. fix
 - b. increase
 - c. decrease
 - d. reduce
 the temperature.
4. Condensation changes the matter from
 - a. solid – liquid
 - b. liquid – gas
 - c. gas – liquid
 - d. liquid – solid
 state to
5. When we boil water, it will
 - a. condense.
 - b. freeze.
 - c. melt.
 - d. evaporate.
6. In cold weather, drops of water are
 - a. melted
 - b. evaporated
 - c. condensed
 - d. frozen
 on the windows of houses.
7. A compound has all the following properties, except that its components
 - a. combine chemically.
 - b. form new substance.
 - c. change in their shapes.
 - d. do not change chemically or physically.
8. To separate sand only from salty water, we can use
 - a. filtration
 - b. evaporation
 - c. melting
 - d. freezing
 process.
9. Salt can be separated by
 - a. melting
 - b. evaporation
 - c. freezing
 - d. condensation
 of salty water.



Choose from column B what suits it in column (A)

(A)	(B)
1. Condensation	a. is the change of water from solid state to liquid state.
2. Melting	b. is the change of water from gas state to solid state.
3. Freezing	c. is the change of water from gas state to liquid state.
4. Evaporation	d. is the change of water from liquid state to gas state.
	e. is the change of water from liquid state to solid state.

1.

2.

3.

4.

 Put (✓) or (X) :

1. When chocolate melts, its particles get closer together. ()
2. Evaporation process means that matter changes from liquid state to gas state. ()
3. When hot water vapor hits cooler air it forms steam. ()
4. We can use evaporation process to form mixtures. ()
5. You can see the different components of the salty water. ()
6. The properties of the components of mixture change after mixing them with each other. ()
7. Evaporation and filtration are ways of mixtures separation. ()
8. The substances that form a compound combine physically forming a new substance. ()
9. Sand and rocks mixture is considered from solid and liquid mixtures. ()

 Write the scientific term of each of the following

1. It is the process by which matter changes from liquid state to gas state. (.....)
2. It is the process by which matter changes from gas state to liquid state. (.....)
3. It is the substance that consists of more than one matter which don't have any physical or chemical change in their properties. (.....)
4. A matter that is formed when two or more materials combine chemically. (.....)

 Complete the following sentences

1. Water can change from the liquid state to state by increasing its temperature.
2. The distance between particles of water is very small in case of its state.
3. The movement of particles of matter increases in case of and processes.
4. By decreasing the temperature of water vapor, it releases energy and changes into water.
5. Salty water is a mixture that consists of salt which is a state of matter and water which is a state of matter.
6. When two substances combine and form a new substance, this new substance is called a
7. To separate mud from salty water we can use process.
8. To separate salt from salty water we can use process.

Give reasons for :

1. Formation of water drops when water vapor touches a cold surface.

2. Fruit salad and salty water are considered as mixtures.

3. Filtration process is used to separate soil from water.

What happens to ... ?

1. The particles of water when we increase its temperature above 100°C .

2. Salty water when heating it for a long time.

Which of the following is a mixture?

1. The components of this mixture combine chemically.

()

2. The components of this mixture are solids only.

()

3. The mixing process affects the properties of each component in this mixture.

()



Write down the state of matter which form the following mixtures by using the words below :

(Solid and liquid - Gas - Solid - Liquid)

Fruit salad



1. materials.

Air



2. materials.

Oil in water



3. materials.

Sugar in water



4. materials.

Activity 10 Mixing It Up with Mass

► Put (✓) or (x) :

1. When mixing salt and water, the salt loses its salty taste. ()
2. In a mixture of two different solid materials, the mass of each material is not affected before and after mixing. ()

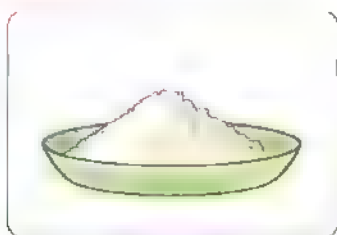
► You have learned that when we mix substances, mixtures or compounds are formed. **So**, when mixing substances, what happens to their masses after mixing when their properties change and when their properties don't change ?

► To answer these questions, we can do the following experiments.

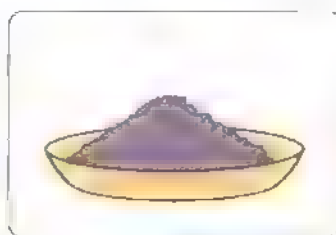
Experiment 1

To show what happen to masses of substances after mixing when their properties don't change after mixing.

► Tools



Salt



Pepper



Water



Oil



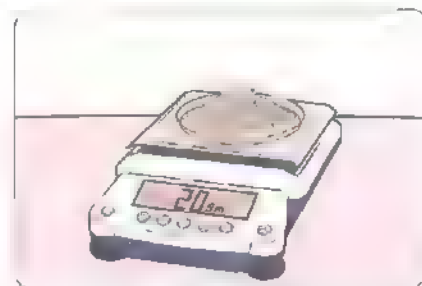
Balance



Spoons

► Steps

1. Weigh 10 gm. of salt and 10 gm. of pepper using the balance.
2. Mix the salt and pepper together using a spoon, then weigh the mass of this mixture and compare between the summation of their masses before and after mixing.



Salt and pepper

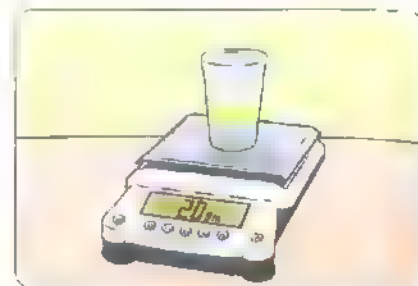
► Observations

The mass of the mixture is equal to the summation of their masses after mixing

- The properties of the substances don't change after mixing.

3. Weigh 10 gm. of water and 10 gm. of oil using the balance.

4. Mix the water and oil together using a spoon, then weigh the mass of this mixture and compare between the summation of their masses before mixing and after mixing.



Water and oil

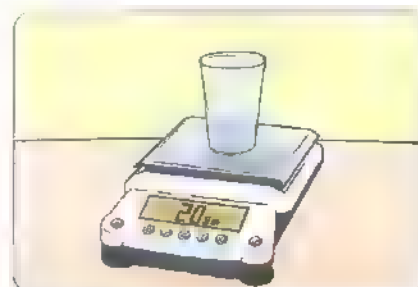
► Observations

The mass of the mixture is equal to the summation of their masses after mixing

- The properties of the substances don't change after mixing.

5. Weigh 10 gm. of salt and 10 gm. of water using the balance.

6. Mix the salt and water together using a spoon, then weigh the mass of this mixture and compare between the summation of their masses before mixing and after mixing.



Salt and water

► Observations

The mass of the mixture is equal to the summation of their masses after mixing.

- The properties of the substances don't change after mixing.

► Conclusion

The masses of substances before mixing are equal to the masses of these substances after mixing when their properties don't change (when forming a mixture).

Experiment 2

To show what happens to masses of substances after mixing when their properties change after mixing.

Tools



Vinegar



Baking soda



Iodine



Cornstarch



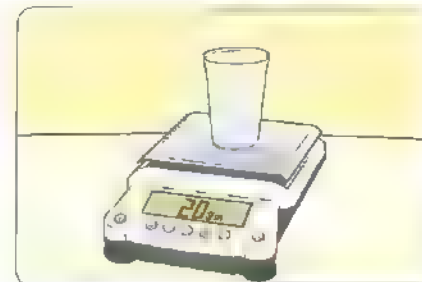
Balance



Spoons

Steps

1. Weigh 10 gm. of vinegar and 10 gm. of baking soda using the balance.
2. Mix the vinegar and baking soda together using a spoon, then weigh the masses of them after mixing and compare between their masses before mixing and after mixing.



Vinegar and baking soda

Observations

- The summation of their masses before mixing equals the summation of their masses after mixing.
- A gas formed causing bubbles which means that the properties of the substances change after mixing.

3. Weigh 10 gm. of cornstarch and 10 gm. of iodine using the balance.
4. Mix the cornstarch and iodine together using a spoon, then weigh the masses of them after mixing and compare between their masses before mixing and after mixing.



Cornstarch and iodine

► Observations

- The summation of their masses before mixing equals the summation of their masses after mixing
- A compound formed and its color is dark blue which means that the properties of the substances change after mixing

► Conclusion

The masses of substances before mixing are equal to the masses of these substances after mixing when their properties change (when forming a compound).

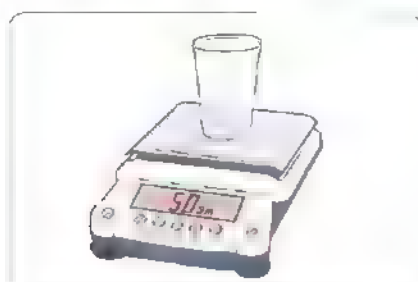
So, the total masses of substances after mixing is equal to their total masses before mixing even if their properties change as they react with each other.



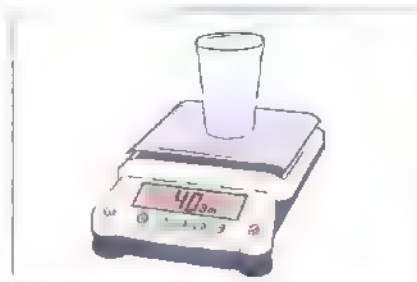
Check your understanding

► Choose :

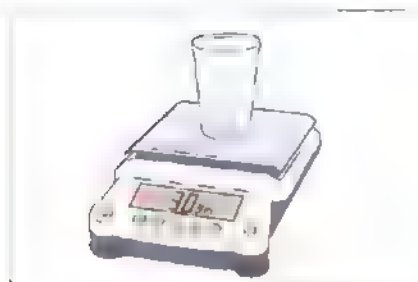
The balance that represents the correct mass of a mixture of 10 gm. of salt and 30 gm. of water is balance number



(1)



(2)



(3)



(4)

In the Assessment Book .

Try to answer

Self Assessment (33)

Exercises on Lesson 4

● Evaluate

Choose the correct answer :

- By adding baking soda to vinegar, a _____ is formed.
 powder compound mixture solid matter
- If we mix two equal masses of salt and oil so, their total mass will ... after mixing.
 equal to zero decrease increase not change
- The of iodine will not change after mixing it with starch.
 a. mass only b. color only
 color and mass properties and mass
- If we have 6 gm of water and 6 gm of sugar, after mixing them the mass of whole mixture will be gm.
 a. 15 b. 10 c. 12 d. 6
- By adding iodine to starch, the color of the formed compound will change into
 dark green. dark blue. orange. yellow.
- If we mix 150 gm of banana with 50 gm of apple, the mass of banana only will be gm after mixing.
 a. 50 b. 100 c. 200 d. 150

Put (✓) or (X) :

- The mass and properties of oil will change when mixing it with vinegar. ()
- The properties of mango will be the same if we mix it with banana. ()
- By adding iodine to starch, their masses and color will not change. ()
- If we add 10 gm of salt to 5 gm of pepper, the mass of mixture will be 15 gm. ()
- The mass of 50 gm of sugar will decrease by adding it to 100 gm of water. ()
- By mixing some vegetables together their properties will change. ()

(the same – mixture – mass – compounds – color – properties – changed)

- The mass of a mixed substance will not be changed during formation of ... , but their properties will be changed.
- The mass of salt in salty water will be ... after the mixture is formed.

3. By adding iodine to starch, their will change into dark blue forming a new compound.
4. By mixing salt with pepper, a is formed which has no change in the and of its components.
5. By adding baking soda to vinegar, the properties of the formed substance will be

Give a reason for the following :

By adding baking soda to vinegar the properties of each of them are changed.

.....

.....

What happens to

The mass and properties of sugar when adding it to an amount of flour.

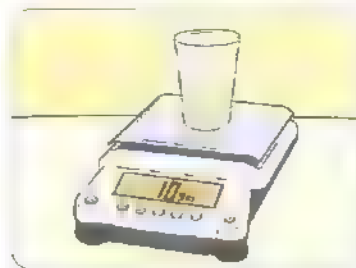
.....

.....

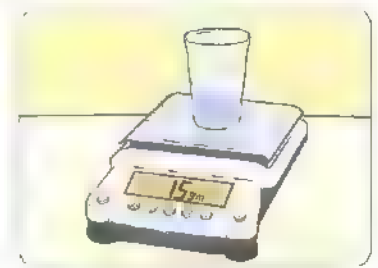
Look at the following figures, then choose the correct answer.



Starch
Figure (A)



Iodine
Figure (B)



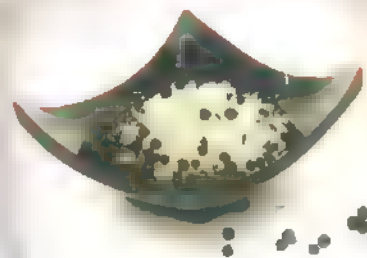
Starch + Iodine
Figure (C)

1. The mass of starch in figure (C) equals (a) 5 gm (b) 10 gm (c) 15 gm
2. The mass of iodine in figure (C) equals (a) 5 gm (b) 10 gm (c) 15 gm
3. The color of iodine in figure (C) is (a) colorless (b) yellow (c) dark blue
4. The produced substance in figure is called compound. (a) (A) (b) (B) (c) (C)

Activity 11 Properties of Mixtures

Put (✓) or (x) :

1. The opposite picture does not show a mixture. ()
2. The parts in the opposite picture can be separated. ()



Salt and pepper

You have learned that mixtures are formed of mixing two substances or more together.

Properties of mixtures

- Mixtures are made of two or more substances that are physically combined together that means they do not react together.

Example :

- The mixture of the salty water consists of water and salt which don't react together.



- The substances that form mixtures can be physically separated from each other by simple ways such as filtration process and evaporation process.

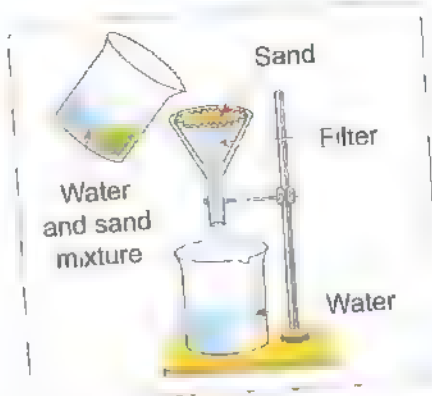
Example :

- We can separate the parts of a mixture of sand and water by using filtration process.

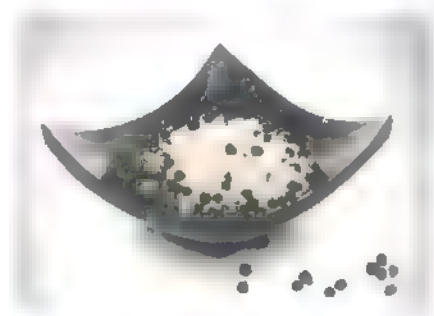
- Solids, liquids and gases can form mixtures.

Examples :

- A mixture of oil and water consists of two liquid materials mixed together.



- A mixture of salt and pepper consists of two solid materials mixed together.



Air is a mixture of some gases.



Check your understanding

► Put (✓) or (x) :

1. The substances that make mixtures react chemically with each other. ()
2. Mixtures are made of only one kind of substances. ()
3. Air is not a mixture. ()
4. We cannot separate the components of a sand and water mixture. ()

Activity 12 Physical Changes in Our Lives

- Physical change is a type of changes that may occur to different materials around us.
- You have learned that physical change is a change in matter without any change in its structure.
- Physical changes don't form somethings new (new substances) but they can change size, shape or state of matter.

Examples of changes in our lives

Paper

Cutting a paper into small pieces.



Burning a paper forming ash.



In cooking

Making salad :

Cutting vegetables don't make them different but they have the same taste with changes in their sizes.



Making bread :

The baker mixes flour, water, sugar and yeast, then the baker bakes them. The taste of the bread is not like its ingredients.



? Give a reason for :

Cutting a paper into small pieces is considered as a physical change.

Because cutting a paper is a change of the shape of paper without any change in its structure.

Notes

1. Melting wax is a physical change.



2. When some metals react with oxygen, they lose their shining and this change is not a physical change.



Check your understanding

► Put the following changes in the correct place in the table below :
(Making fruit salad – Melting ice – Burning clothes – Cutting pieces of cloth – Losing shining of a metal)

Physical changes	Chemical changes
.....
.....
.....
.....

► Put (✓) or (x) :

- Melting of wax is not a physical change. ()
- Cutting a piece of paper is a chemical change while burning a paper is a physical change. ()

Activity 13 Chemical Changes in Matter

- In the previous activity, you have learned that there are some changes that happen to matter which are called physical changes and there are some other changes which are not physical changes. In this activity we will know that the "not physical changes" are called "**chemical changes**".

Chemical change :

It is a change in matter with a change in its structure producing a new matter.

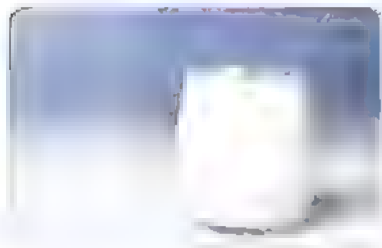
- There are some **examples** that shows a chemical change occurs.

Examples :

- When burning a piece of paper, you can feel the **heat**, see the **smoke** and observe the **ash** that is formed.
- When you strike a match, you can feel the **heat** and see the **flame** of the burned match.



- When mixing vinegar with baking soda, gas **bubbles** appear.
- When baking a cake in the oven, the **taste** of the cake is different from the taste of its ingredients.



Note

Physical changes differ from chemical changes, where in physical changes there are no changes happen in the chemical properties of the substances for example, water before and after freezing is still water.



Self-Assessment

► Put (✓) or (x) :

- Fireworks exploding in the air is a chemical change. ()
- In the chemical changes, the chemical properties of matter change. ()

producing
ash
fireworks

إنتاج
رماد
العاب نارية

evidences
strike

الأدلة
يُشعل

In the Assessment Book :

Try to answer .

Self-Assessment 34

Examples of Mixtures

● Identify

○ Apply

● Analyze

● Evaluate

● Create



Choose the correct answer :

1. Components of mixture can react together.
 - a. vinegar and baking soda
 - b. salt and water
 - c. salt and pepper
 - d. oil and water
2. Among ways of mixture separation is/are
 - a. evaporation only.
 - b. filtration only.
 - c. evaporation and rusting.
 - d. evaporation and filtration.
3. Among mixtures between two liquids is
 - a. vinegar and salt mixture.
 - b. orange juice and apple juice.
 - c. salty water mixture.
 - d. sand and water mixture.
4. From the changes which don't form a new substance is
 - a. burning of paper.
 - b. cutting of wood.
 - c. baking bread.
 - d. rusting of iron.
5. Buring of a paper is considered as change of matter.
 - a. only chemical
 - b. only physical
 - c. both physical and chemical
 - d. neither physical nor chemical
6. Among chemical changes which is occurred in cooking is
 - a. cutting vegetables.
 - b. boiling of water.
 - c. melting of chocolate.
 - d. baking a cake.
7. During burning of wood, energies are produced.
 - a. electrical and light.
 - b. thermal and light.
 - c. thermal and electrical.
 - d. sound and electrical.
8. The taste of all the following doesn't change after mixing them together, except
 - a. salt and water.
 - b. sugar and water.
 - c. cake ingredients after baking.
 - d. fruit salad ingredients.
9. Evaporation process is a change of matter, which can be used to separate the components.
 - a. physical – mixture
 - b. physical – compound
 - c. chemical – mixture
 - d. chemical – compound

 Put (✓) or (X) :

1. Mixtures are formed by a combination between two substances or more chemically. ()
- 2. You can taste the salt in salty water mixture. ()
3. You can separate oil from water by filtration process. ()
4. Atmospheric air is considered as a mixture because it consists of liquids and gases matter. ()
5. Formation of ash during burning of paper is considered as a change which form a new substance. ()
- 6. Melting of wax produces new substance. ()
7. Cutting a piece of cloth is considered as a physical change because it produces a new substance. ()
- 8. When you strike a match, light energy and electrical energy are produced. ()
9. Salt and pepper mixture is formed from two solid materials mixed together. ()

 Complete the following sentences :

1. We can separate dusts from water by using process.
2. Cutting a paper into pieces is considered as a change, while burning it is considered as a change.
- 3. Making salad doesn't produce substance.
4. The reaction between some metals and gas causes loss of their shining, and this reaction is considered as a change of matter.
5. Melting of wax is a change, while burning of wood is a change.

 Give reasons for :

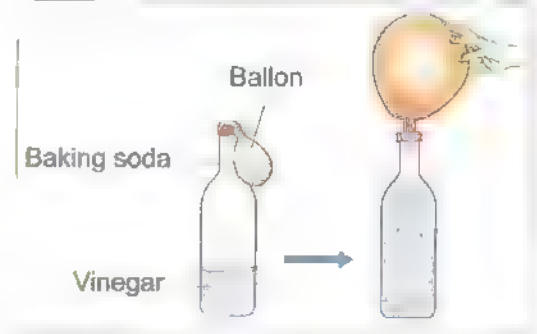
1. The components of mixture don't produce a new substance when combining together.
.....
2. Air is considered as a mixture.
.....
3. Making fruit salad is considered as a physical change.
.....
4. Making bread is considered as a chemical change.
.....

What happens if ... ?

1. You leave an amount of salty water exposed to sunlight for several days.

2. You expose a shiny piece of metal to air (oxygen) for a long period of time.

As shown in the diagram, the balloon inflates when the baking soda in the balloon is mixed with vinegar. What does cause this to happen ?



Activity 14 Chemical Change

► Look at the pictures and answer the questions.

1. The picture shows a physical change.

(A – B)

2. The picture (A) shows formation of new substance that means a change happens.

(physical – chemical)



Picture (A)



Picture (B)

✶ In the previous activities, you have learned that the chemical change is a change in matter with a change in its structure producing new matter.

So, When two or more substances are combined (react), a chemical change occurs forming a new substance, where :

- This new substance is different physically from the original substances such as its shape, color etc.
- This new substance has different chemical properties that differ from the chemical properties of the original substances.

Examples :

- When combines (reacts) with and , they form

* Rust is a chemical substance called which is a layer with reddish color.



Rusting of a vehicle



Rusting of an iron nail

- When oxygen combines with carbon and hydrogen, they release heat that can start a fire.

* The fire can change substances as wood into ash.



- When vinegar combines with baking soda, they form gas bubbles.



Notes

1. There are important chemical changes take place inside your body where chemicals produced in your body help in the food digestion.
2. The physical changes differ from the chemical changes where chemical changes are not reversed easily.



Check your understanding

Ques 1: (a) Complete the following sentences using the words given.
(rust – oxygen – chemical – water)

1. The iron combines with and forming rust.
2. The changes that are not reversed easily are changes.
3. When iron toys are left out in rain, is formed.

Activity 15 How Has It Changed?

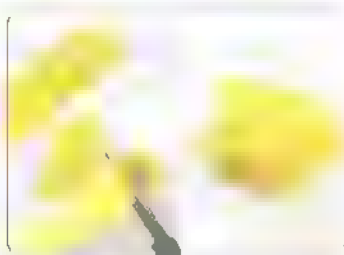
- You have learned that there are two types of changes of matter that happen around us in our daily life which are physical and chemical changes.
- The following evidences can be used to differentiate between the physical and chemical changes.

Some Physical Changes are Physical Changes

Change in size

Examples :

- Cutting a paper.



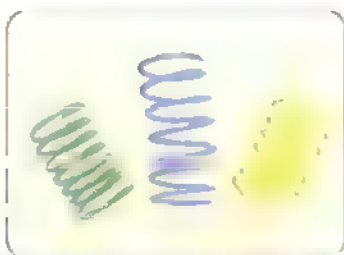
- Cutting a fruit.



Change in shape

Examples :

- Coiling a straight piece of wire to form a spring.



- The flow of sand in an hourglass changes the shape of sand in the container.



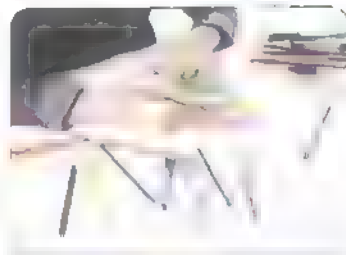
Expected change in color

Examples :

- Adding drops of food colors to a cup of water.



- Coloring a paper.



Change in state of matter

Examples :

- Melting of a piece of chocolate.



- Evaporation of water.



- From the previous examples, we can conclude that physical changes don't produce new substances.

Unexpected color change

Example :

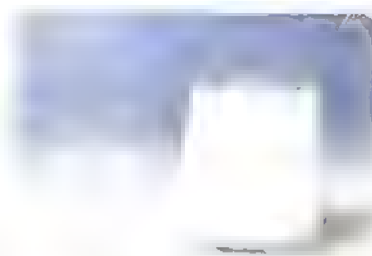
When mixing iodine with cornstarch, a new substance is formed and its color is dark blue.



Formation of gas bubbles

Example :

When mixing baking soda with vinegar, gas bubbles appear.



Formation of strong odor

Example :

Living a cup of milk out of the fridge for about two days can produce a bad smell.



- From the previous examples, we can conclude that chemical changes produce new substances.



Check your understanding

Is Cooking (the frying) of food a change?

Change	Physical or chemical change	Evidence
- Melting a piece of butter.		
- Frying an egg.		
- Painting a piece of wood.		
- A bread is left in an oven for a long time that it smells like something burned.		

In the Assessment Book :

Try to answer :

• Self-Assessment 35

Exercises on Lesson 6

Apply

Examine

 Choose the correct answer :

1. All the following examples belong to physical changes, except
a. cutting a piece of paper. b. melting of ice.
c. digestion of food. d. condensation of water vapor.
2. The change that is produced as a result of iron rusting is the same change produced from
a. melting of ice. b. making bread.
c. cutting a piece of cloth. d. breaking of glass.
3. Exposing an amount of salty water to sunlight for a long time causes
a. freezing of water. b. formation of a new substance.
c. a chemical change to water. d. a physical change to water.
4. Among examples of physical changes is
a. melting of iron. b. burning of wood.
c. making a cake. d. digestion of food.
5. Iron nail will rust when it reacts with
a. carbon dioxide and water. b. carbon dioxide and vinegar.
c. oxygen and vinegar. d. oxygen and water.
6. When oxygen combines with carbon and hydrogen, ... energy is produced.
a. electrical b. thermal c. kinetic d. solar
7. All the following are examples of physical changes in size, except
a. cutting a paper. b. cutting a piece of banana.
c. coloring a piece of paper. d. cutting some vegetables.
8. Among chemical unexpected color change is the color that is produced from mixing
a. baking soda with vinegar. b. iodine with cornstarch.
c. food colors with water. d. salt with water.
9. Which of the following is considered as a chemical change that occurs to a piece of paper ?
a. Coiling it. b. Coloring it.
c. Cutting it into pieces. d. Burning it.

(A)	(B)
1. Expected change in color	a. cutting a tomato into small pieces.
2. Formation of strong odor	b. adding drops of food colors to a cup of water.
3. Change in size	c. mixing iodine with cornstarch.
4. Unexpected change in color	d. leaving a cup of milk out of fridge for a long time.
	e. mixing salt with water.

1.

2.

3.

4.

Put (✓) or (X) :

- 1. Burning of wood is a chemical change. ()
- 2. When dissolving salt in water, the salt disappears forming a new substance. ()
- 3. Rusting of iron doesn't change the structure of iron. ()
- 4. During chemical change, the properties of the matter will be changed. ()
- 5. We can separate baking soda from vinegar easily after mixing them together. ()
- 6. There is a change in shape when you coil a piece of paper. ()
- 7. When leaving a cup of milk out of the fridge for a long time, it will form a new substance. ()

Complete the following sentences :

- 1. The change in the structure of the original matter producing a new matter is known as change.
- 2. Boiling of water to form water vapor is considered as a change.
- 3. Digestion of food forms a new which has new
- 4. Making yoghurt from milk is a change.
- 5. Changing the color of iodine and starch mixture is a change, while changing the color of water and food color mixture is a change.
- 6. Iron rusting is a change, while iron painting is a change.

Give reasons for :

- 1. Formation of a layer with reddish color on the surface of a wet iron wire after a period of time.
.....
- 2. Formation of a bad odor when milk is left out of the fridge for several days.
.....

What happens if ... ?

1. We mix iodine with cornstarch.

2. Oxygen, carbon and hydrogen are combining together.

Ships body which are made of iron exposed to damage are to a type of change that you are studied.

1. What is the type of change that takes place ?

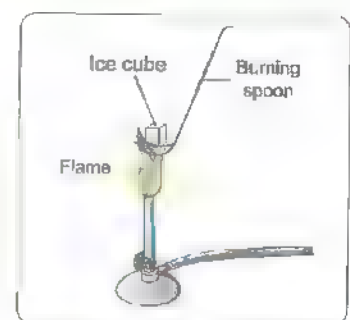
2. When iron reacts with and ,
the body of ship loses its shining as
a result of iron (complete)



Look at the opposite figure, then answer :

1. What will happen to the ice cube ?

2. What is the type of change ?
(Give a reason for your answer).



► In this concept, you have learned a lot about what happens to the matter when it is heated cooled or mixed with other substances.

Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

Step 1 The Question

What happens to the mass of a substance when it is heated, cooled or mixed with other substances ?

2 My Claim

3 My Evidence

4 My Scientific Explanation

Activity 17 S T E M In Action

► Put (✓) or (x) :

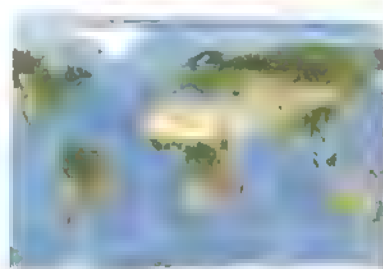
1. The salt water of seas and oceans is considered as a mixture. ()
2. The components of mixtures can be separated. ()



salt water of sea

Plenty of Water, But None to Drink

- Many people around the world cannot reach fresh water although about 70 % of the surface of the Earth is covered by oceans. But we cannot drink the water of oceans and seas because it is a mixture of water, salt, other minerals, gases, living organisms and dead organisms. But we can use desalination processes to drink this water.

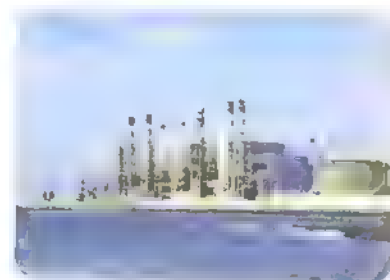


Desalination :

It is the process of removing salt from water.

- How do we separate fresh drinkable water from the mixture of ocean's water ?

As you have learned in the previous lessons that we can use filtration and evaporation processes to separate the components of a mixture as ocean's water where :



Desalination plant

1 Filtration :

It removes any large materials such as seaweed, shells and fish.

- Water, salts, minerals and gases would pass through filters that makes water still undrinkable.

2 Evaporation :

When boiling the filtered water, water vapor rises up leaving salts and other minerals.

- When cooling the water vapor, it is turned into liquid water and it is safe to drink it.

Problems of desalination

- It requires a lot of energy.
- It is very expensive process.
- It may lead to environmental problems such as :
 - Small marine organisms can be hurt due to sucking of water into the desalination plants.
 - The water that contains a very big amount of salt that is pumped back to oceans after desalination can be dangerous to the marine life.



Notes

1. Drinking salt water makes the human body dehydrate faster which means that the human body loses water faster.
2. Egypt has over 80 desalination plants.



Check your understanding

► Put (✓) or (x) :

- | | |
|---|---------|
| 1. We use desalination process to remove salt from water. | () |
| 2. We can drink salt water. | () |
| 3. Desalination does not have any disadvantages. | () |
| 4. Egypt does not have any desalination plant. | () |

Activity 18

Physical Changes in Matter

- We can summarize this concept in the following main points :
- Matter can be changed from one state to another without any change in its amount, mass and total number of particles.

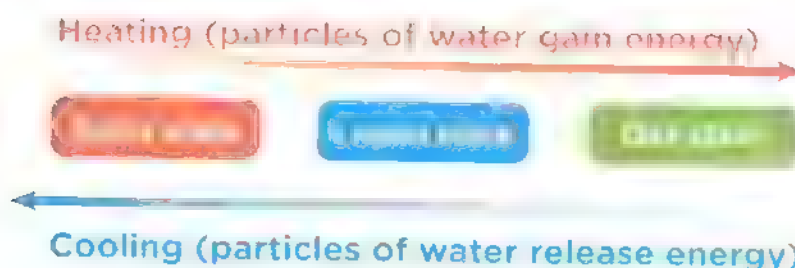
Melting :

It is a process in which a matter is changed from solid to liquid state when its temperature increases.

- The thermal energy affects the state of matter.

Physical changes :

They are changes in matter without any change in their structures.



Mixture :

It is a matter formed of two or more materials that don't combine chemically.

- The total mass of substances after mixing is equal to their total mass before mixing even if their properties change.

Chemical changes :

They are changes in matter with changes in their structures producing new matter.

Desalination :

It is the process of removing salt from water.

In the Assessment Book :

Try to answer :

- Self-Assessment (36)
- Model Exam on Theme (2)

5. After evaporation of seawater, the water vapor turns into liquid water by cooling. ()
6. Among environmental problems which caused by desalination process is that it is very expensive process. ()
7. Drinking salt water makes the human body dehydrate slower. ()



1. The process of removing salt from salt water. (.....)
2. The process which can be used to remove any large materials from sea and ocean water. (.....)
3. The process which can be used to separate salt and minerals from salt water of seas and oceans. (.....)



(salt - filtration - energy - marine - fresh - oceans - expensive - seas)

1. We can drink water, so we cannot drink the water of and
2. We can remove seaweed, shells and fish from ocean's water by using process.
3. Among the problems of desalination process is that it requires a lot of .. and it is very process.
4. After desalinating water, the water that is pumped back to oceans contains very large amount of which can harm the life.



Give a reason for the following :

We cannot drink the water of oceans and seas.

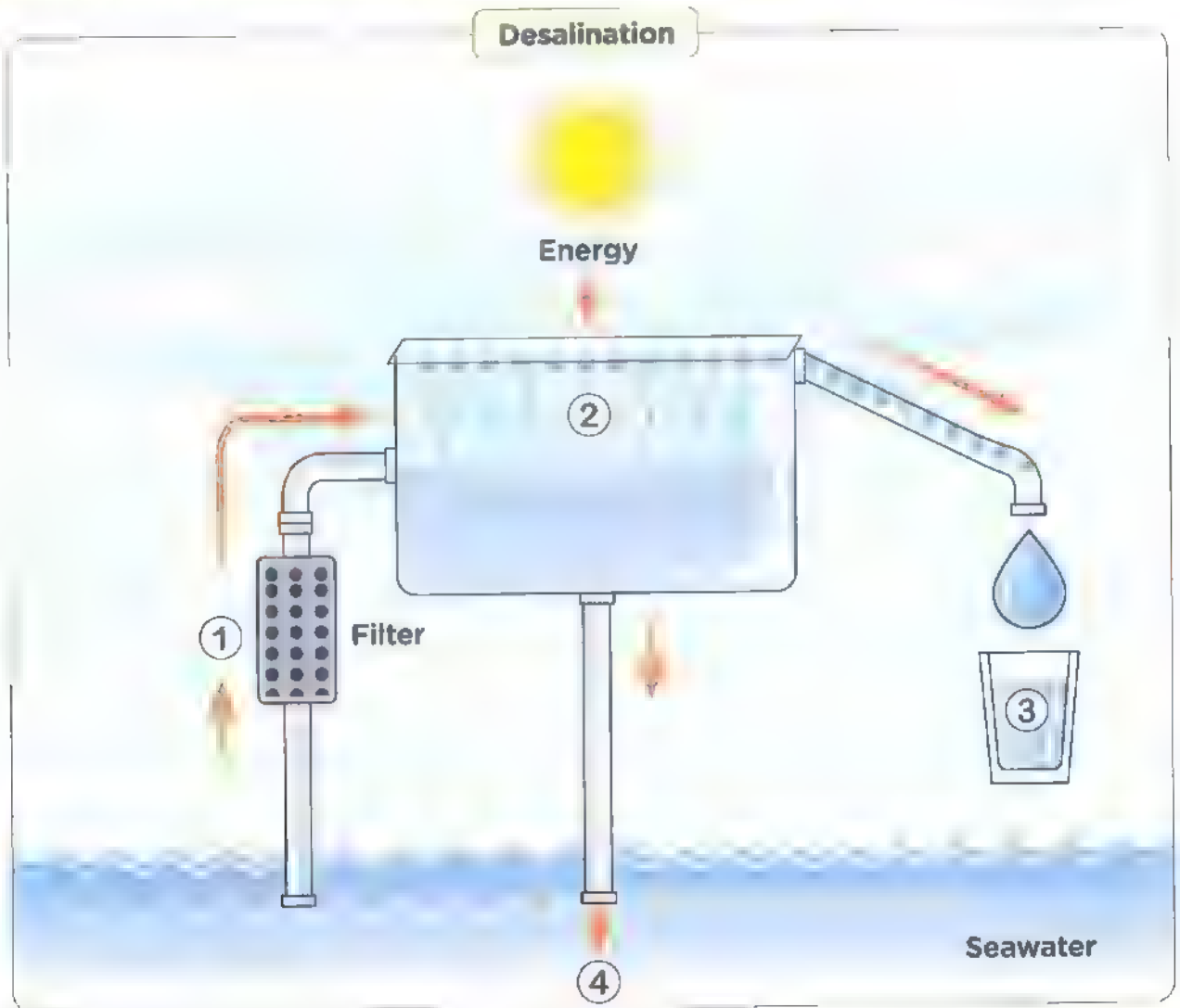
.....



What happens if ...?

You boil an amount of seawater for a long time.

.....



1. The number which represents filtration process is
2. The number which represents the water that contains very big amount of salt and minerals is
3. The number which represents evaporation process is
4. The number which represents the drinkable water is

(1 - 2 - 3 - 4)

Model Exam on Concept (2.3)

Total mark

20

Figure 1. The effect of the initial concentration of the monomer on the polymerization of α -methylstyrene initiated by TiCl_4 in CH_2Cl_2 at -78°C for 10 min. The concentration of the initiator was 0.01 mol/L .

(compounds - temperature - chemical - new)

1. Matter can be changed from one state to another by changing its
2. The mass of mixed substances will not be changed during formation of, but their properties will be changed.
3. Making salad don't produce substance.
4. Making yoghurt from milk is a change.

(B) Give a reason for the following :

Air doesn't have a definite volume or shape.

(A) Choose the correct answer :

(5 marks)

1. When the water is heated, its particles
 - a. move faster.
 - b. move slower.
 - c. move with the same speed.
 - d. don't move.
2. Exposing an amount of salty water to sunlight for a long time causes
 - a. freezing of water.
 - b. formation of a new substance.
 - c. a chemical change to water.
 - d. a physical change to water.
3. Desalination process means that we remove from water to drink it.
 - a. sugar
 - b. salt
 - c. oxygen gas
 - d. hydrogen gas.
4. The of iodine will not change after mixing it with starch.
 - a. mass only
 - b. color only
 - c. color and mass
 - d. properties and mass

(B) What happens to ... ?

The mass and properties of sugar when it is mixed with an amount of flour.

(A) Put (✓) or (X) :

(5 marks)

1. Melting and freezing are reversible processes. ()
2. Particles of solid matter are spread out from each other. ()

3. Melting of wax produces new substance. ()
4. After evaporation of seawater, the water vapor is turned into liquid water by cooling. ()

Identify the physical and chemical changes.

1. A matter that is formed when two or more materials combine chemically. (..)
2. The process of removing salt from salt water. (..)

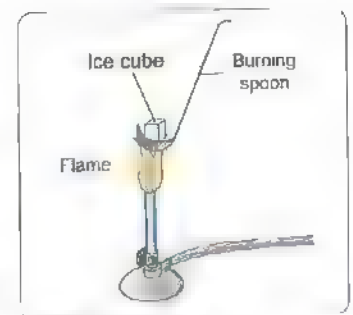
Write down the physical and chemical changes.

(A)	(B)
1. Expected change in color.	a. cutting a tomato into small pieces.
2. Formation of strong odor.	b. adding drops of food colors to a cup of water.
3. Change in size.	c. mixing iodine with cornstarch.
4. Unexpected change in color.	d. leaving a cup of milk out of fridge for a long time.
	e. mixing salt with water.

1. 2. 3. 4.

(B) Look at the opposite figure, then answer :

1. What will happen to the ice cube ?
.....
2. What is the type of change ? (Give a reason for your answer)
.....



SCIENCE

Adaptation and Survival

Adaptation and Survival



5

This Assessment Book

Includes Three Parts

Part

1

Self-Assessments :

(Page 3)

Include :

- Cumulative self-assessments on lessons of each concept.
- Cumulative model exam on concepts.
- A model exam on each theme.



Part

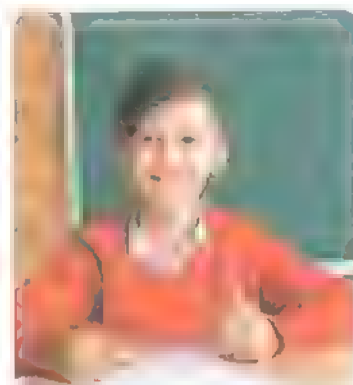
2

Final Examinations :

(Page 55)

Include :

- Models of final examinations on the first term.



Part

3

Projects

(Page 73)

Include :

- Unit one project.
- Interdisciplinary project.
- Unit two project.



PART

1

Self-Assessments



Content

THEME ONE : Systems

UNIT ONE : Interactions of Organisms

Plant Needs :

Concept

1.1

- Self Assessments
from (1) to (6) 5 - 10
- Model Exam
on Concept (1.1) 11 - 12

Energy Flow in Ecosystems :

Concept

1.2

- Self-Assessments
from (7) to (12) 13 - 19
- Model Exam on Concepts
(1.1) & (1.2) 20 - 21

Changes in Food Webs :

Concept

1.3

- Self-Assessments
from (13) to (18) 22 - 26
- Model Exam
on Theme (1) 27 - 29

THEME TWO : Matter and Energy

UNIT TWO : Particles in Motion

Matter in the World Around Us :

Concept

2.1

- Self-Assessments
from (19) to (24) 30 - 35
- Model Exam
on Concept (2.1) 36 - 37

Describing and Measuring Matter :

Concept

2.2

- Self-Assessments
from (25) to (29) 38 - 43
- Model Exam on Concepts
(2.1) & (2.2) 44 - 45

Comparing Changes in Matter :

Concept

2.3

- Self-Assessments
from (30) to (36) 46 - 52
- Model Exam
on Theme (2) 53 - 54

Self-Assessments

on Concept (1.1)

Self-Assessment 1 (10 Minutes)

(A) Choose the correct answer :

1. The plant absorbs water from the soil through its
a. roots. b. stems. c. leaves. d. flowers.
2. The substance which is produced by the plant during photosynthesis process is
a. sunlight. b. water. c. sugar. d. carbon dioxide gas.
3. All the following substances are not important for the plant growth, except
a. rocks. b. insects. c. flowers. d. air.

(B) Give a reason for the following :

Without leaves the plants can't grow or survive.

.....
.....

(A) Put (✓) or (X) :

1. Some plants can grow in the absence of soil. ()
2. Plant leaves absorb carbon dioxide gas from water. ()
3. Animals, humans and plants have the same structure that help them to grow and survive. ()

(B) What happens if ... ?

We cover the green leaves of the plant to prevent sunlight from reaching them.

.....
.....

Use the following words to complete the sentences below :

(root – stem – leaves – oxygen – water – nutrients – carbon dioxide)

1. From the plant's structures that photosynthesis process takes place in it is
2. The plant's transfers water from of the plant to different parts of the plant.
3. In the absence of gas, the plant can't make its own food.
4. By photosynthesis process the plant produces and gas.

(A) Put (✓) or (X) :

1. Seeds of beans will die if we put them on a wet paper towel and provide it with nutrients. ()
2. Plants can live without leaves. ()
3. Soil is important for the seeds to complete their growth. ()

(B) Give a reason for the following :

Stem is an important part for the plant.

.....

.....

(A) Correct the underlined words :

1. Digestive system is a place that should be full of water and minerals to help the plant grow. (.....)
2. Leaves of plants are responsible for absorption of water from the soil. (.....)
3. Oxygen gas is a basic need that the plant takes from the air to make its own food. (.....)

(B) What happens if ... ?

We put some bean seeds in a place containing water and nutrients for some days.

.....

(A) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Germination	a. is not important for plants in their initial growth.
2. Water	b. means the formation of sprouts from the seed when it begins to grow.
3. Soil	c. the plant get it from air.
	d. is from the basic needs of the plant to survive.

1.

2.

3.

Self-Assessment 3 till Lesson 3

(A) Choose the correct answer :

- During photosynthesis process, the green leaves take from air to make its own food.
 - carbon dioxide gas
 - oxygen gas
 - water
 - sunlight
- The water and nutrients reach plant's leaves by the help of
 - roots only.
 - xylem and air.
 - xylem and roots.
 - roots and sunlight.
- All the following are basic needs for plants to survive, except ..
 - sunlight.
 - air.
 - water.
 - insects.

(B) Give a reason for the following :

Green leaves become pale green or yellow when the plant is placed in a dark room.

.....

(A) Put (✓) or (X) :

- Plants and humans can make their own food. ()
- Roots help the plant to transport gases through stomata. ()
- The growth of the plant's seeds depends on the presence of the sunlight. ()

(B) What happens if ... ?

The plant's leaves are removed during its growth.

.....

Use the words below to complete the following sentences

(yellow – green – stomata – xylem – oxygen gas)

- The color of leaves in Pot (1) is while in Pot (2) is
- Gases can come in or out the leaves due to the presence of
- During photosynthesis process, will be produced from the plant
- Water and nutrients can reach leaves of plant through



Pot (1)



Pot (2)

(A) Correct the underlined words :

1. Phloem in plant's leaves absorb the energy of sunlight. (.....)
2. There are tubes in the plant's root that help it to absorb more water from the soil. (.....)
3. Green leaves produce carbon dioxide gas during photosynthesis process. (.....)

(B) What happens to ... ?

The plant's leaves when the plant is placed in a cup containing colored water.

.....

.....

(A) Complete the following sentences :

1. The of plant is responsible for absorption of water and nutrients from the soil.
2. Gases can come in or out the leaves through
3. The plant's support leaves and flowers of the plant.

(B) Give a reason for the following :

There are tubes called phloem inside plant's leaves.

.....

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Pine trees	a. have climb stems.
2. Potato plants	b. have runners stems.
3. Vines	c. have tubers.
4. Tree trunks and shrubs	d. have wood stems.
	e. have needles leaves.

1. 2. 3. 4.

Self-Assessment 5 till Lesson 5

1 (A) Choose the correct answer :

1. Gases enter plants through
 a. leaves. b. stems. c. roots. d. flowers.
2. Arteries carry blood rich in
 a. carbon dioxide gas. b. oxygen gas and glucose sugar.
 c. oxygen and carbon dioxide gases.
 d. carbon dioxide gas and glucose sugar.
3. Flowers produce for reproduction.
 a. leaves b. stems c. seeds d. roots

(B) Give a reason for the following :

Soil may not have been included as a basic need for plant growth.

.....

.....

2 (A) Put (✓) or (X) :

1. Plants have roots, stems, leaves and sometimes flowers or fruit. ()
2. Germinating means that the plant sprouts and begins to grow from a seed. ()
3. During photosynthesis, green plants use sunlight to combine oxygen with water to make sugar. ()

(B) What happens if ... ?

Roots of plants don't have root hairs.

.....

.....

3 Use the words below to complete the following sentences (you can use the same word many times) :

(phloem – xylem – veins – nutrients – sugar – arteries – oxygen)

1. The vessels of contain carbon dioxide gas and is low in and oxygen gas, carry blood from all body parts back to the heart.
2. The tubes that carry from the leaves to all plant parts are called
3. The tubes that carry nutrients from the roots the leaves are called
4. The vessels of carry blood rich in and , carry blood from the heart to all body parts.

(A) Put (✓) or (X) :

1. Maple seeds have spines to stick to animal fur. ()
2. Plants can grow in a dark room. ()
3. Flowers are important parts of plants that help them for reproduction. ()

(B) Give a reason for the following :

Root hairs are important for plants.

(A) Write the scientific term of each of the following

1. Tubes responsible for transferring food from the leaves to other parts of the plant. (.....)
2. Tiny openings inside plant's leaves through which gases come in or out the plant. (.....)
3. The process of producing new plants. (.....)

(B) What happens to ... ?

Plant's leaves color if the plant can't absorb water from the soil for many days.

Look at the opposite figures then answer the following questions :



Plant's seeds (1)



Plant's seed (2)

1. Plant's seeds number (1) can be dispersed by because they are
2. Plant's seed number (2) can be dispersed by

Model Exam

on Concept (1.1)

20

(A) Complete the following sentences :

1. Plants absorb .. and .. from the soil through their ..
2. Without in the leaves of plants, gases can't move in or out the plant.
3. Tree trunks and shrubs have stems, while most flowers have stems.
4. Transport system in the plant consists of two types of vessels which are and ..

(B) Give a reason for the following :

Xylem in plant is a one-way vessel.

(A) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Coconut seed	a. sticking to animal fur.
2. Maple seeds and dandelion seeds	b. floating on water.
3. Burdock seeds	c. being eaten by animals.
4. Tomato seeds and apple seeds	d. traveling by wind.
	e. staying inside flowers without movement.

1. 2. 3. 4.

(B) What happens if ... ?

We remove the flowers of a plant.

(A) Put (✓) or (X) :

(5 marks)

1. Humans, animals and plants need food and water to survive. ()
2. All seeds need soil in its initial growth. ()
3. There are tiny holes opening on the surface of stem that allow gases to pass through into the plant. ()
4. Vines have a kind of stems called climb stems. ()

(II) Write the scientific term of each of the following .

1. It is found in plant's leaves that gives them green color and absorbs energy from the sunlight. (.....)
2. A substance that is produced from the plant during photosynthesis process and provides it with its needed energy. (.....)



(A) Choose the correct answer :

(5 marks)

1. Food materials are transported from the leaves to other parts of the plant by
a. xylem. b. phloem. c. chlorophyll. d. stomata.
2. Without, plants can't grow well.
a. insects b. rocks c. sunlight d. moonlight
3. We can replace the soil as a source of nutrients and water by
a. digestive system. b. root system.
c. hydroponic system. d. respiratory system.
4. Plants make their food by a process called
a. respiration. b. absorption.
c. digestion. d. photosynthesis.

(B) Correct the underlined words :

1. Human circulatory system consists of lungs and blood vessels. (.....)
2. Plant's leaves absorb water and nutrients from the soil. (.....)

Self-Assessments

on Concept (1.2)

Self-Assessment 7 on Ecosystem

(A) Put (✓) or (X) :

1. There is on any energy flow between the components of an ecosystem. ()
2. We don't need any energy during sleeping. ()
3. All living organisms can do photosynthesis process. ()

(B) Give a reason for the following :

Photosynthesis process is the most important process that occurs in nature.

.....
.....

(A) Complete the following sentences :

1. Without energy that comes from the Sun, plants cannot make their own food.
2. Consumer eats or may eat another consumer.
3. The plant takes its needed energy from sugar which is formed during photosynthesis process.

(B) What happens to ... ?

The continuity of life in an ecosystem, when there is no plants in this ecosystem

.....
.....

Look at the following two ecosystems, then choose the correct answer :



Ecosystem (1)



Ecosystem (2)

1. The predator can find a prey in
 a. ecosystem (1) only. b. ecosystem (2) only.
 c. both ecosystems (1) and (2). d. neither ecosystems (1) nor (2).

2. The light energy of the Sun can pass from plants to the predator in _____
- ecosystem (2) in the absence of the prey.
 - both ecosystems (1) and (2).
 - ecosystem (1) only.
 - ecosystem (2) only.
3. Photosynthesis process occurs in _____
- both ecosystems (1) and (2).
 - ecosystem (1) only.
 - ecosystem (2) only.
 - ecosystem (1) in the absence of water.

8

(A) Choose the correct answer :

- Photosynthesis process, means
 - making glucose in the absence of light energy.
 - making glucose in the presence of light energy.
 - using glucose to produce energy.
 - using salts to produce energy.
- If a spider eats a bee that feeds on a plant,
 - both spider and bee are primary consumers.
 - both spider and bee are secondary consumers.
 - the bee is a secondary consumer.
 - the spider is a secondary consumer.
- The predator that feeds on a living organism, may be _____ for another living organism.

a. a decomposer	b. a producer
c. a prey	d. a primary consumer

(B) Give a reason for the following :

Producers depend on light energy of the Sun to grow.

.....

.....

(A) Cross out the odd word :

- Producers – Consumers – Nonliving things – Decomposers. (.....)
- Sunlight – Glucose – Consumers – Photosynthesis process. (.....)
- Fungi – Snakes – Millipedes – Bacteria. (.....)

(B) Study the following food chain, then complete the sentences below.

Plant → Grasshopper → Bird → Snake → Hawk.

– The is a producer, because

– The is a secondary consumer, because

 Compare between producers, consumers and decomposers according to definition :

P.O.C	Producers	Consumers	Decomposers
Definition :

Self-Assessment 9 till Lesson 3

 (A) Choose the correct answer :

- The model that shows many interactions between different types of living organisms is known as
a. food chain. b. food web. c. ecosystem. d. habitat.
- All the following are basic needs for human to survive, except
a. water. b. food. c. oxygen. d. electricity.
- All the following are producers, except
a. grasses. b. trees. c. bacteria. d. algae.

(B) Give a reason for the following :

In a food chain, a bird is not considered as a secondary consumer if it eats plants.

.....
.....

 (A) Cross out the odd word :

- Lions – Sharks – Tigers – Foxes. (.....)
- Fungi – Bacteria – Plants – Millipedes. (.....)
- Bacteria – Rabbit – Sheep – Goat. (.....)

(B) Use the following living organisms to form a food chain that contains only one top predator :

(Deer – Lion – Grasses – Crocodile)

.....

Study the following three groups of living organisms, then choose the correct answer below :

Group (A)	Group (B)	Group (C)
– grasses	– cows	– grasses
– graps	– ducks	– foxes
– carrots	– chickens	– hawks
– potato	– rabbits	– rabbits
– tomato	– fish	– fish

1. What is the only group that shows producers and consumers living organisms ?
 - a. Group (A).
 - b. Group (B).
 - c. Group (A) or (B).
 - d. Group (C).
2. Group (B) shows
 - a. producers and decomposers.
 - b. consumer and decomposers.
 - c. primary consumers.
 - d. secondary consumers.
3. Energy can flow in a food chain, between animals of
 - a. group (B).
 - b. group (C).
 - c. group (A).
 - d. group (B) or (A).
4. Decomposers
 - a. are present in group (A).
 - b. are present in group (B).
 - c. are present in group (C).
 - d. not present in any group.

Self-Assessment 10 till Lesson 4

(A) Cross out the odd word :

1. Chicken – Fox – Duck – Rabbit. ()
2. Eagle – Hawk – Rabbit – Crocodile. (.....)
3. Rabbit – Eagle – Mouse – Chicken. (.....)

(8) Give a reason for the following :

Desert ecosystem contains few members of primary consumers.

(A) Complete the following paragraph using the words below.

(grasses – sunlight – insects – frogs)

The main source of energy for is the to make their own food, then they are eaten by that is considered as a primary consumer, while is considered as a secondary consumer.

(B) What happens if ... ?

All preys that a top predator can eat are removed from an ecosystem.

.....

.....

- 1** Study the following three figures that represent animals as squares where the bigger one can eat the smaller one, then choose which figure can express a food chain :

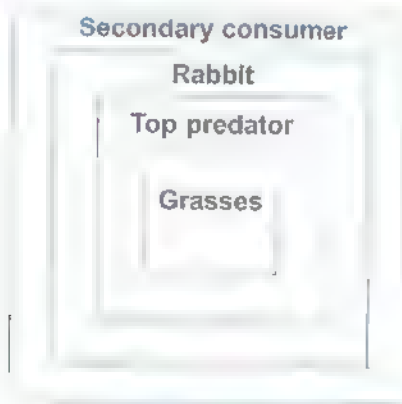


Figure (A)

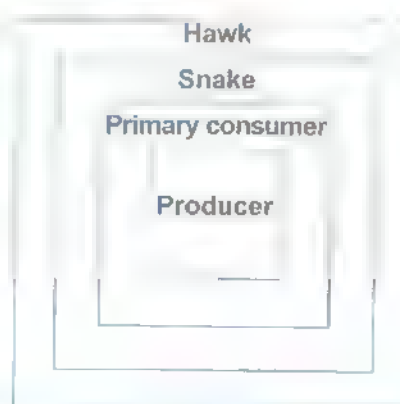


Figure (B)

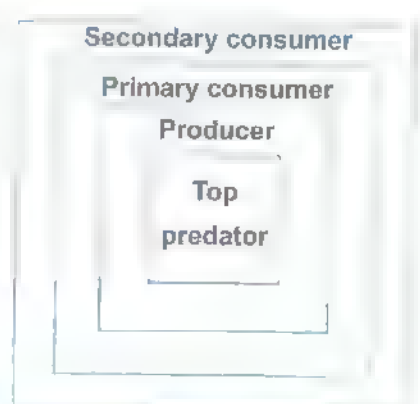


Figure (C)

Self-Assessment 11 till Lesson 5

1 (A) Choose the correct answer :

1. Hyenas and house flies are living organisms.
 - a. decomposers
 - b. scavengers
 - c. producers
 - d. top predators
2. Crabs and sea snails are working together to do
 - a. photosynthesis process on land.
 - b. photosynthesis process in water.
 - c. natural recycling process on land.
 - d. natural recycling process in water.
3. Vultures may fight hyenas for
 - a. a living organism on land.
 - b. a dead organism on land.
 - c. a living organism in deep water.
 - d. a dead organism in deep water.

(B) What happens if ... ?

All species of scavengers are removed away from an ecosystem.

.....

.....

(A) Cross out the odd word :

1. Millipedes – Slugs – Crabs – Mushrooms. ()
2. Rabbits – Bacteria – Deers – Sheeps. ()
3. Pine trees – Apple trees – House flies – Grasses. ()

(B) Give a reason for the following :

Consumers cannot directly use the nutrients that resulted from natural recycling process.

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Humans	a. return nutrients back to the soil.
2. Earthworms	b. return nutrients back to the water.
3. Grasses	c. recycle the waste materials to make new products.
	d. produce nutrients for itself and for primary consumers.

1. 2. 3.

Self-Assessment 12 till Lesson 6

(A) Put (✓) or (X) :

1. Plant ecologists can restore habitats for plants which are important for all other living organisms. ()
2. Restoring ecology may causes extinction of some animals. ()
3. Sticky seeds need water to be dispersed. ()

(B) Give a reason for the following :

Light seeds are dispersed by wind.

(A) Choose the correct answer :

1. Plant-community ecologist do their studies and researches on ...
 - a. plants only.
 - b. animals only.
 - c. plants and animals.
 - d. producers and consumers.
2. If a plant don't disperse its seeds, so this plant population will
 - a. increase.
 - b. decrease.
 - c. not affected.
 - d. posetively affected.

3. All plants disperse their seeds
- a. through wind only.
 - b. by sticking to animals bodies only.
 - c. in many different ways.
 - d. through water only.

(B) What happens if ... ?

Scientists and people don't restore a damaged ecosystem.

.....

.....

 **Rearrange the following steps, to restore a damaged plant ecosystem :**

- (.....) Supply healthy water.
- (.....) Prevent pollution.
- (.....) Remove waste products.

Model Exam

on Concepts (1.1) & (1.2)

Total mark

20

(A) Choose the correct answer :

1. Wind play an important role in dispersing _____ seeds.
a. floating b. sticky c. big heavy d. small light
2. system in plants consists of tubes that water and nutrients move through it.
a. Digestive b. Respiratory c. Transport d. Nervous
3. To make a food web, you have to classify animals in an ecosystem according to their they get.
a. gases b. food c. light d. water
4. The kind of stems that extended underground are called
a. climb stems. b. tubers. c. runners. d. wood stems.

(B) What happens if ... ?

All the primary consumers disappear from a certain food chain.

.....

.....

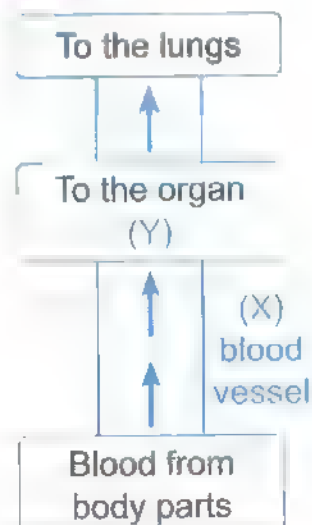
(A) Put (✓) or (X) :

(5 marks)

1. Photosynthesis process takes place in the plant's roots. ()
2. Decomposers include mushroom fungus and slugs. ()
3. At the beginning of germinating some bean seeds, they can grow without soil or sunlight. ()
4. Birds eat insects as a prey to get their energy. ()

(B) The following figure represent a blood vessel, which answer represents (X) & (Y) :

	(X)	(y)
a	Artery	The heart
b	Vein	The brain
c	Vein	The heart
d	Artery	The lungs



- (A) Form the following food chain by using the given words between bracket, then complete the sentences below :**

(Duck – Grasses – Fox)



1. This food chain doesn't contain consumer.
2. The group of living organisms that responsible for the final link of this food chain are
3. Grasses changes the energy of the Sun into energy during process.

(B) Correct the underlined words :

1. There are tiny holes on the stem to allow gases passes into the plant. (.....)
2. Most flowers have wood stems. (.....)

(A) Write the scientific term of each of the following :

1. The gas that is present in air and necessary for the formation of plant foods. (.....)
2. Small structures in the plant's roots that increase the absorption of water and nutrients from the soil. (.....)
3. It is a process through which decomposers can recycle nutrients back into the soil. (.....)
4. Part of the plant that are responsible for reproduction. (.....)

(B) Study the following food web, then choose the correct answer below :



1. When disappear from this food web birds are moving away to search for food in another ecosystem.

a. butterflies only	b. worms only
c. grasshoppers only	d. primary consumers
2. Grasshoppers may die, when there is no

a. birds.	b. snakes.	c. grasses.	d. butterflies.
-----------	------------	-------------	-----------------

Self-Assessments

on Concept (1.3)

Self-Assessment 13 on Concept 1

1 (A) Cross out the odd word :

1. Grasses – Algae – Sea stars – Trees. (.....)
2. Clam – Zooplankton – Algae – Sea urchin. (.....)
3. Sharks – Crocodiles – Snakes – Hawks. (.....)

(B) Give a reason for the following :

All food chains depend on sunlight.

2 (A) Choose the correct answer :

1. Any marine food chain doesn't include
 - a. algae.
 - b. zooplankton.
 - c. tiger.
 - d. shark.
2. Flooding which may destroy a desert ecosystem, is due to
 - a. drought condition.
 - b. decreasing producers.
 - c. gentle rain.
 - d. heavy rain.
3. If algae are completely removed from a marine ecosystem, will be negatively affected.
 - a. clam only
 - b. zooplankton only
 - c. clam and zooplankton
 - d. clam, zooplankton and sea urchin

(B) Study the following food chain, then complete the table below :

Algae → Clam → Sea star → Shark

The living organism	Its type
1. Algae
2.	Primary consumer.
3. Sea star
4.	Top predator.

Form a food chain on land environment from the following living organisms :

(Deer – Shark – Grasses – Lion)

Self-Assessment 14 till Lesson 2

(A) Cross out the odd word :

1. Primary consumers – Decomposers – Secondary consumers – Top predators. (.....)
2. Fox – Clam – Rabbit – Eagle. (.....)
3. Lion – Deer – The Moon – Grasses. (.....)

(B) Give a reason for the following :

Predators cannot feed directly on plants.

.....

(A) Correct the underlined words :

1. Energy transfers when a secondary consumer feed on a producer. (.....)
2. All nonliving things can make their own food. (.....)
3. Producers need the energy of moonlight to make photosynthesis process. (.....)

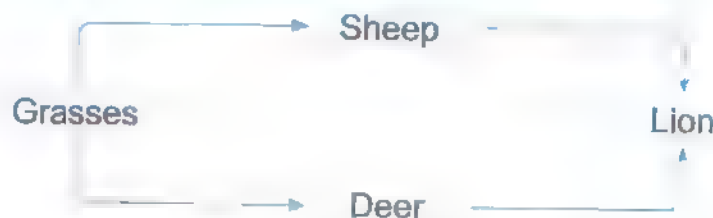
(B) What happens if ... ?

The number of primary consumers more than the amount of producers.

.....

.....

Study the following food web, then put (✓) or (x) below :



1. Energy can transfer from the producer to the deer only. ()
2. Both sheep and deer are primary consumers. ()
3. The sheep is considered as a secondary consumer, if it eats the deer. ()
4. The lion is considered as a secondary consumer and a top predator. ()

Self-Assessment 15 till Lesson 3

(A) Put (✓) or (x) :

1. When the amount of water decreases in an ecosystem, animals suffer from difficulty breathing. ()
2. Micoorganisms that live in water increases, when the water becomes cooler. ()
3. Seabirds eat microorganisms that float on the surface of the seawater. ()

(B) Give a reason for the following :

The food resources of seabirds will be negatively affected if the water of the sea becomes warm.

(A) Complete the following sentences by using words in between bracket :

(microorganisms – small fishes – primary consumers)

1. Producers in the marine food chains, are .
2. Small fishes are considered as , when they eat the producers.
3. Seabirds feed on to get energy.

(B) What happens to ... ?

The food resources of the seabirds when the seawater becomes cooler.

To form a right food chain, rearrange the following living organisms and draw the arrows that show the direction of energy transfer between them :

Small fishes

Seabirds

Microorganisms

Self-Assessment 16 till Lesson 4

(A) Complete the following using the words below :

(microplastics – coral bleaching – plastic)

1. In , the color of coral reefs turns completely into white.
2. Marine living organisms cannot differentiate between real food and waste materials.
3. UV rays coming from the Sun, breakdown plastic products into smaller pieces known as

(B) What happens to ... ?

The coral reefs when the seawater temperature rises.

(A) Correct the underlined words :

1. Due to rising of seawater temperature, coral reefs turn completely into green.
2. Marine living organisms cannot differentiate between water and plastics.
3. Plastics are healthy and smooth , so they cause harm to marine living organisms.

(B) Give a reason for the following :

It is better to recycle plastic waste materials than throwing them in water.

- (C) "If there is no UV rays coming from the Sun, coral reefs will not be negatively affected by plastic waste materials". Do you agree or not, and explain your answer.**

Self-Assessment 17 Lesson 5

1 (A) Choose the correct answer :

1. If you remove coral reefs outside water, it will
a. die. b. survive. c. increase. d. decrease.
2. Coral reefs are considered as a for many marine organisms.
a. primary consumers b. secondary consumers
c. predator d. shelter
3. Sharks will find , due to coral bleaching.
a. big amount of food b. small amount of food
c. the same amount of food d. enough amount of food

(B) What happens to ... ?

Algae when coral bleaching occurs.

2 (A) Put (✓) or (X) :

1. Coral reefs turn completely into white, due to rising temperature of seawater. ()
2. All types of primary consumers can survive in a marine ecosystem, if coral reefs are removed away. ()
3. Microplastics are non-toxic and healthy. ()

(B) Give a reason for the following :

Coral reefs are harmed due to the effect of UV rays on the plastic products thrown in the sea.

- 2** Choose from the following living organisms to form a food chain in seawater :
(Sharks – Algae – Tiger – Coral reefs – Parrot fish)

Self-Assessment 18 till Lesson 6

1 (A) Put (✓) or (x) :

1. Removing plants at river banks, negatively impact the marine ecosystem. ()
2. Habitat restoration projects, include repairing all natural resources of an ecosystem. ()
3. River banks eroding may occur due to removing primary consumers away from an ecosystem. ()

(B) What happens to ... ?

An animal species if the community don't apply habitat restoration projects.

2 (A) Choose from column (A) what suits it in column (B) :

(A)	(B)
1. Coral reefs	a. depend on grasses to get energy.
2. Seabirds	b. depend on deers to get energy.
3. Rabbits	c. depend on microorganisms indirectly to get energy.
	d. depend on algae indirectly to get energy.

1. 2. 3.

(B) Give a reason for the following :

Removing plants at riverbanks harms an ecosystem in many different ways.

3 Correct the underlined words :

1. A coral reef rehabilitation project applied in Egypt coastal communities near the Red Sea, to restore the marine ecosystem.
2. It is important to replace cloth bags, to return a habitat environment to its natural state before harms was done by the formation of microplastics.
3. The place in which we can take care of coral until they grow up, is know as hospital.

Model Exam

on Theme (1)

Total mark

20

(A) Choose the correct answer :

- The roots of a plant absorb _____ from the soil to help it grow.
 - oxygen gas
 - carbon dioxide gas
 - sugar
 - water
- In the decomposition process, the role of _____ comes before the role of
 - predators – producers.
 - consumers – producers.
 - scavengers – decomposer.
 - decomposer – scavengers.
- A hawk can eat _____, when snakes are completely disappear from an ecosystem.
 - leaves
 - birds
 - grasses
 - grasshoppers
- Which of the following substances are produced by the plant during photosynthesis process ?
 - Glucose and oxygen.
 - Carbon dioxide and water.
 - Glucose and carbon dioxide.
 - Glucose and water.

(B) Give a reason for the following :

Sunlight is important for all living organisms.

.....

(A) Write the scientific term of each of the following :

- A type of living organisms that can produce its own food by absorbing sunlight. (.....)
- It is found in plant's leaves that gives them green color and absorbs energy from the sunlight. (.....)
- They are organisms that feed on the dead organisms bodies and break them down into smaller pieces. (.....)
- They are living organisms that include bacteria and fungi, which return nutrients back to the soil. (.....)

(B) What happens to ... ?

The food resources of the seabirds when the seawater becomes warm.

(A) Complete the following sentences :

1. If producers increase in an ecosystem, the primary will increase.
2. Maple seeds and dandelion seeds can travel by because they are
3. Predators living organisms may be for other living organisms.
4. The consumers that exist at the top of any food chain are called

(B) To form a right food chain, rearrange the following living organisms and draw the arrows that show the direction of energy transfer between them :

Small fishes

Seabirds

Microorganisms

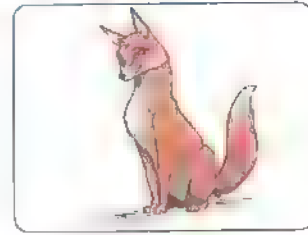
(A) Study the following food chain, then complete the table below :



Grasses



Rabbit



Fox

Situations	Results
1. When the number of rabbits increases.	the amount of decreases, while the number of increases.
2. When the amount of grasses and the number of foxes	the number of rabbits increases.
3. When all disappear or their role change in this food chain.	all foxes are move away to another ecosystem to search for food.
4. When the ecosystem of this food chain is affected by sever drought condition.	all die, because there is no water to make their own food.

(B) Study the following figures, then put (✓) or (X) on the sentences below :

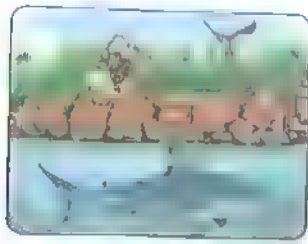


Figure (A)



Figure (B)

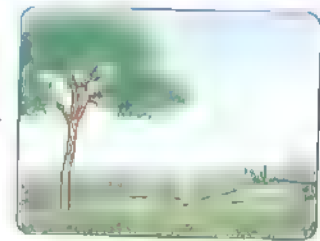


Figure (C)

1. All living organisms in figures (A) and (B) can make their own food by photosynthesis process. ()
2. Some predator living organisms are present in figure (B). ()
3. Top predators are found only in figure (A). ()
4. All living organisms in figure (A) can find a prey in figure (B), except shark. ()

Self-Assessments

on Concept (2.1)

Self-Assessment 19 On Lesson 1

 (A) Correct the underlined words :

1. Sand is an example of liquid matter. (.....)
2. When the temperature of water decreases, it evaporates. (.....)
3. Water vapor is considered as an example of solid matter. (.....)

(B) What happens to ... ?

The state of water when it is heated to a very high temperature.

.....

 (A) Put (✓) or (X) :

1. A mass of matter is the space occupied by this matter. ()
2. A matter may be colored or colorless. ()
3. A matter has two states. ()

(B) Give a reason for the following :

Oil is a matter.

.....

 Classify the following into solids, liquids and gases in the table below :

(Milk – Carbon dioxide – Sugar – Stone – Blood – Oxygen – Oil – Coal – Water vapor)

Solids	Liquids	Gases
.....
.....

Self-Assessment 20 till Lesson 2

 (A) Cross out the odd word :

1. Air – Oxygen – Glass – Carbon dioxide. (.....)
2. Wood – Plastic – Glass – Air. (.....)
3. Oil – Milk – Water – Coin. (.....)

(B) Give a reason for the following :

Gasoline is a liquid matter.

.....

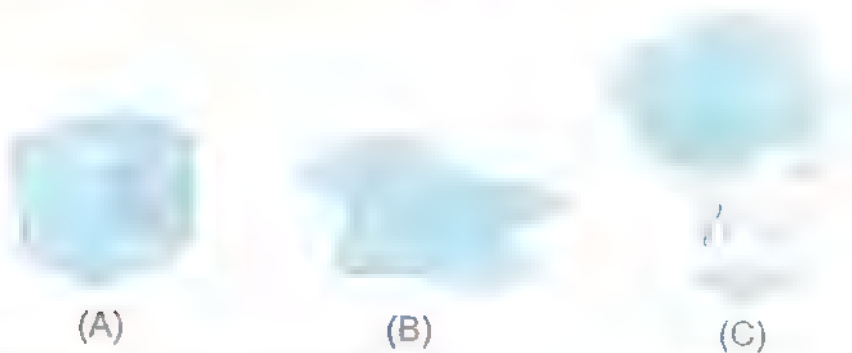
(A) Correct the underlined words :

1. Particles of solid matter have a lot of spaces. (.....)
2. Matter is anything that has color and volume. (.....)
3. A feather is an example for a hard matter. (.....)

(B) What happens to ... ?

The temperature of water when it changes into ice.

.....

Classify the three states of water (A) , (B) , (C) as shown in the figure according to :

1. Spaces between particles (Ascendingly).
-

2. Energy of particles (descendingly).
-

21
(A) Correct the underlined words :

1. A matter consists of millions of tiny states. (.....)
2. To see some particles of a matter, we have to use a measuring tape. (.....)
3. Particles of liquids are tightly packed. (.....)

(B) Give a reason for the following :

Regular microscope was invented.

.....

(A) Complete the following sentences :

1. Particles of matter can slide over each other, so they take the shape of their containers.
2. Particles of matter can move very quickly in all directions.
3. Both shape and volume of a coin is as it is a solid substance.

(B) What happens to ... ?

The speed of movement of solid particles after its melting.

.....

Look at the opposite figure, then put (✓) or (X) :



1. These two substances are in solid state. ()
2. We can distinguish between these two substances by smell. ()
3. Spaces between particles of the two substances are very narrow. ()
4. Particles of these two substances are similar to each other. ()

Self-Assessment 22 till Lesson 4

(A) Correct the underlined words :

1. Ice is the liquid state of water. (.....)
2. To see the components of one blood cell, we have to use a regular microscope. (.....)
3. To measure the length of your book, you can use a balance scale. (.....)

(B) What happens to ... ?

The shape of an ice cube when it melts.

.....

(A) Put (✓) or (x) :

1. Air is a gas that is made up of large visible particles. ()
2. Solar system can be seen by using a microscope. ()
3. Particles of wood vibrate around their places. ()

(B) Give a reason for the following :

If a metallic spoon is transferred from a place to another, its shape and volume don't change.

Choose from columns (B) & (C) what suits it in column (A) :

(A)	(B)	(C)
1. Glass	a. has no definite shape or volume.	1. Its particles have no energy.
2. Water	b. has no definite volume and definite shape.	2. Its particles have low energy.
3. Air	c. has on definite shape and definite volume.	3. Its particles have medium energy.
	d. has definite shape and volume.	4. Its particles have high energy.

1.

2.

3.

Self-Assessment 23**Oil Liquids****(A) Put (✓) or (x) :**

1. Models can help us see things that are too small or too big to observe. ()
2. A group of students stands very closely together in a small area may represent a model of a gas matter. ()
3. The mass of an iron cube is the amount of space that this iron cube takes up. ()

(B) Give a reason for the following :

A golden ring is considered a matter.

(A) Correct the underlined words :

1. Particles of liquids are arranged in a regular pattern. (..)
2. Light is a form of matter. (.....)
3. A model is a copy that is different from a real thing. (..)

(B) What happens if ... ?

We try to examine the structure of a germ with our naked eye.

.....

(A) Classify the following matter according to the arrangement of particles into regular pattern of random arrangement in the table below :

(wood – water – plastic – oxygen – oil – carbon dioxide)

Regular pattern	Random arrangement
.....
.....
.....
.....

Self-Assessment 24 till Lesson 6

(A) Put (✓) or (X) :

1. A rock is a matter as it has mass and volume. ()
2. Models are designed to let things be studied more hard. ()
3. Particles of a ruler are packed very close to each other. ()

(B) Give a reason for the following :

Water vapor has on definite shape or volume.

.....

(A) Correct the underlined words :

1. The amount of space occupied by a substance is related to its mass. (.....)
2. The shape of liquids doesn't change whatever the container they are put in. (.....)
3. Particles of gases have a regular pattern. (.....)

(B) What happens to ... ?

The speed of particles of water when it is heated.

Look at this picture which shows the water cycle in nature, then complete the following sentences :



1. Label (1) refers to a matter in state.
2. Label (2) refers to a matter in state.
3. Label (3) refers to a matter in state.
4. Label (4) refers to the evaporation process in which the state of matter changes from to

Model Exam

on Concept (2.1)

Total mark

20

(A) Complete the following sentences :

1. Matter is made up of tiny
2. Earth is a planet in the system.
3. To describe the particles of a matter in state by modeling balls, we should put the balls packed together.
4. Particles of matter can slide over each other.

(B) Give a reason for the following :

Salt is a solid matter.

(A) Choose the correct answer :

1. All of these substances are liquids, except
a. oil. b. milk. c. stone. d. vinegar.
2. Gases have shape and volume.
a. definite – definite. b. no definite – no definite.
c. definite – no definite. d. no definite – definite.
3. The movement of particles of water are slower than that of
a. wood. b. plastic. c. air. d. gold.
4. We can use a model to study very large things such as
a. solar system. b. germs. c. microbes. d. viruses.

(B) What happens to ... ?

The arrangement of particles of water after its freezing.

(A) Put (✓) or (X) :

(5 marks)

1. Most of ingredients of vegetable salads are in solid form. ()
2. All matter have only one shape. ()
3. Particles of water can move more freely than the particles of water vapor. ()
4. Particles of an aluminium spoon are similar to particles of a golden ring. ()

(B) Cross out the odd word :

Coal – Carbon dioxide – Oxygen – Air.

(.....)



(A) Write the scientific term of each of the following .

(5 marks)

1. A device used to examine one tiny particle such as a blood cell. (.)
2. A copy that is similar to a real thing which we cannot observe with our eyes. (.....)
3. The state of water after its freezing. (.....)
4. The state of matter that has a lot of spaces between its particles. (.....)

(B) Choose from column (B) what suits it in column (A) .

(A)	(B)
1. Milk 2. Air	a. Its particles are packed tightly. b. Its particles have medium energy. c. Its particles move very freely.

1.

2.

Self-Assessments

on Concept (2.2)

Self-Assessment

25

Self-Assessment

(A) Complete the following sentences using the words below :

(climate – slanted – thermometer)

1. The roof of tropical rainforest home is ... and made of leaves and sticks.
2. The material that is used in making roofs of desert homes and cold weather homes are different due to the difference in
3. When we have to know the temperature of boiling water, we can use the

(B) Give a reason for the following :

Rains can't enter homes of cold weather regions.

(A) Put (✓) or (X) :

1. Balance can be used to measure the length of your friend. ()
2. Strong stones protect the roofs of desert homes from dust and dirt. ()
3. We may need to measure more than one property to identify an unknown matter. ()

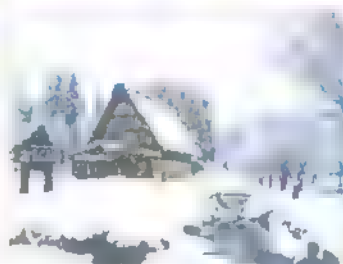
(B) Mention the tool that is used in measuring the following properties :

1. The mass of some oranges. (.....)
2. The volume of an amount of juice. (.....)

Look at the following picture, then complete the following sentences :



Home (1)



Home (2)



Home (3)

1. Ceramic tiles are used in making the roof of home (.....) to protect it from
2. Strong stones are used in making the roof of home (.....) to protect it from and
3. Leaves and sticks are used in making the roof of home (.....) to protect it from

(A) Choose the correct answer :

1. From the physical properties which can't be measured by using a special tools is
 - a. volume.
 - b. color.
 - c. mass.
 - d. length.
2. Which of the following homes have a flat roofs ?
 - a. Desert homes only.
 - b. Cold weather homes only.
 - c. Desert homes and tropical rainforest homes.
 - d. Desert homes and cold weather homes.
3. When the particles of a matter move with high speed, its increases.
 - a. mass
 - b. length
 - c. volume
 - d. temperature

(B) Give a reason for the following :

A mass of one thousand of paper clips equals a mass of one kilogram of an orange.

[illegible]

(A) Correct the underlined words :

1. The mass of two kilograms of lemon is measured by using a measuring cup. (.....)
2. The volume of a liquids can be measured in kilogram. (.....)
3. The temperature of a matter is considered from the chemical properties which can be measured. (.....)

(B) What happens if ... ?

A wet iron nail exposed to air for a period of time.

[illegible]

Look at the following figures, then complete the following sentences :



Tool (A)



Tool (B)

1. Tool (A) is used to measure the of different matter.
2. Tool (B) is used to measure the of different matter.
3. The measuring units that are used to describe the measurement of tool (A) are and
4. The measuring units that are used to describe the measurement of tool (B) are , and

Self-Assessment 27 till Lesson 3

(A) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Iron nail	a. sinks in water and doesn't attract to the magnet.
2. Piece of stone	b. floats on water and attracted to the magnet.
3. Piece of wood	c. sinks in water and attracted to the magnet.
	d. floats on water and doesn't attract to the magnet.

1.

2.

3.

(B) Give a reason for the following :

When we cut a piece from an apple, the mass of the whole apple will change.

(A) Put (✓) or (X) :

1. The attraction of different materials to the magnet is from chemical properties of matter. ()
2. The length of wood bar can be measured by a ruler. ()
3. Ceramic tiles protect desert home roofs from dust and dirt. ()

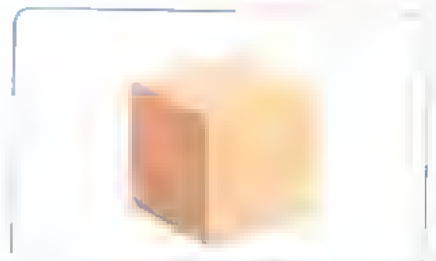
(B) What happens if ... ?

We put a piece of plastic close to a magnet.

1 Look at the following pictures, then choose the correct answer



A paper clip
material (A)



A wood cube
material (B)

1. If we put the two previous materials in water, which material sinks ? _____
(material (A) – material (B))
2. If a magnet is put close to the two materials, which material doesn't attract to the magnet ? _____
(material (A) – material (B))
3. We can measure the mass of each material by using a _____
(ruler – balance)

Self-Assessment 28 till Lesson 4

1 (A) Choose the correct answer :

1. The used materials in making cooking pans are _____
 a. copper and glass. b. copper and helium.
 c. glass and helium. d. copper and wood.
2. Both _____ are sinking in water and attracted to the magnet.
 a. stone and iron nail b. paper clip and iron nail
 c. paper clip and wood spoon d. plastic ruler and wood spoon
3. 1 kilogram of iron = 1 kilogram of cotton. This sentence means that both materials are equal in _____
 a. mass only. b. volume only.
 c. volume and mass. d. mass and temperature.

(B) Give a reason for the following :

Glass is used in making eyeglasses.

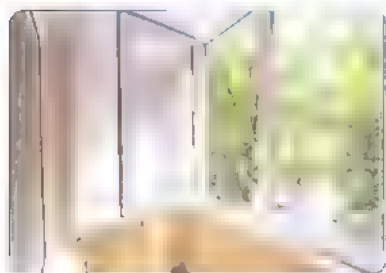
(A) Cross out the odd word :

1. Shape – Mass – Rusting – Color. (.....)
2. Kilogram – Liter – Cubic centimeter – Milliliter. (.....)
3. Piece of wood – Iron nail – Piece of cork – Piece of stone. (.....)

(B) What happens if ... ?

You put a piece of cork in a beaker filled with water.

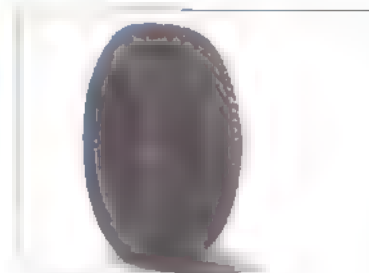
Look at the following pictures, then complete the following sentences



Tool (A)



Tool (B)



Tool (C)

1. Tool (..) is made of steel, because it is . and .
2. Tool (..) is made of rubber, because it is . and .
3. Tool (..) is made of glass, because it is . and .

Self-Assessment 29 till Lesson 5

(A) Choose the correct answer :

1. Mass is a measurement of the
 a. odor of flower. b. length of wood bar.
 c. amount of flour. d. color of apple.
2. We can define volume as the amount of _____ that matter takes up.
 a. space b. time
 c. temperature d. water
3. From the people which use balances in their works are
 a. cartographers. b. bakers.
 c. paleontologists. d. space scientists.

(B) Give a reason for the following :

Cartographers create marine charts.

 (A) Put (✓) or (X) :

1. Air is a matter so it has mass. ()
2. The ability to rust is one of the physical properties of matter. ()
3. Cartographers can measure the mass of the Earth planet. ()

(B) What happens if ... ?

You touch a handle of a cooking pan made of copper and putted on gas oven.

 Look at the following figures, then complete the following sentences using the words below :

(meter – mass – kilogram – architects – length – bakers)



Figure (1)



Figure (2)

1. Tool in figure (1) is used to measure _____ and its measuring unit is
2. Tool in figure (1) is used by in their work.
3. Tool in figure (2) is used to measure and its measuring unit is
4. Tool in figure (2) is used by in their work.

Model Exam

on Concepts (2.1) & (2.2)

20

1 (A) Complete the following sentences using the words below

(rubber – increases – microscope – mass)

1. When an ice cube is exposed to the Sun, the speed of movement of its particles
2. The of your school bag can be determined by a balance.
3. A model of a germ helps us to see its shape without using a which is used to magnify tiny objects.
4. As is a waterproof material, we can use it in making gloves.

(B) Give a reason for the following :

Rusting of iron is considered from chemical properties of matter.

2 (A) Put (✓) or (X) :

(5 marks)

1. If we put a wood cube in water, it will float. ()
2. Space scientists can't measure the mass of stars in the space. ()
3. Air particles are visible as they are very large particles. ()
4. Particles of wood are different from particles of plastic. ()

(B) What happens if ... ?

Water changes into ice.

(according to its shape).

3 (A) Choose from column (B) what suits it in column (A) :

(5 marks)

(A)	(B)
1. Paleontologists	a. They measure lengths and widths of building walls.
2. Cartographers	b. They measure the size and shape of fossils.
3. Marine biologists	c. They measure the mass of planets and stars.
4. Architects	d. They are measuring and mapping Earth's surface.
	e. They measure the speed of sound from animals as whales and dolphins.

1.

2.

3. ..

4.

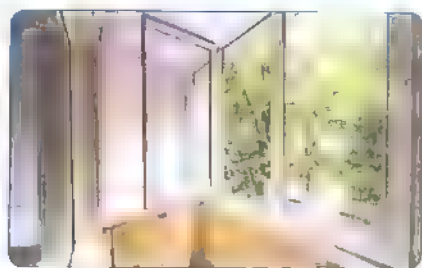
(B) Correct the underlined words :

1. Liquids don't take the shape of the container that it is placed in. (.....)
2. The mass of two kilograms of lemon is measured by using a measuring cup.
(.....)

(A) Choose the correct answer :

1. When water becomes ice, this means that it changes from state to state.
a. solid – liquid b. solid – gas
c. liquid – solid d. liquid – gas
2. Oil takes the of its container.
a. volume b. shape c. color d. mass
3. If we cut a tomato into two halves, so the of one half of tomato will decrease to half.
a. color b. mass c. temperature d. shape
4. All the following can be used to describe matter, except
a. shape. b. color. c. price. d. texture.

(B) Look at the following pictures, then complete the following sentences :



Tool (A)



Tool (B)

1. Tool (.. ..) is made of steel, because it is hard and strong.
2. Tool (.. ..) is made of glass, because it is transparent and smooth.

Self-Assessments

on Concept (2.3)

Self-Assessment 30 on Lesson 1

1. (A) Complete the following sentences using the words below

(cooled - mass - melting)

1. If we mix an amount of oil with an amount of vinegar, the of both of them will not change.
2. Ice is turned into water by process.
3. When a matter is , its particles speed will decrease.

(B) Give a reason for the following :

The water takes the shape of the cup which exists in it.

.....

2. (A) Correct the underlined words :

1. When the temperature of ice increases, it melts and turns into steam.
(.....)
2. Wood is considered from solids, because it has definite color and shape.
(.....)
3. When a matter is heated, its particles move slower.
(.....)

(B) What happens if ... ?

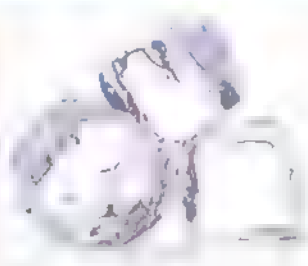
You leave some cubes of ice in a warm room.

.....

3. Look at the following pictures, then choose the correct answer



(A)



(B)



(C)

1. The solid state of water is picture (A - B - C)
2. The liquid state of water is picture (A - B - C)
3. The gas state of water is picture (A - B - C)
4. In which picture the particles of matter are close together ?
(A - B - C)

(A) Complete the following sentences :

1. When ice gain energy, its temperature increases and changes into
2. Freezing process can change water into which has definite and
3. When the ice is exposed to temperature above 0°C , it will have definite but doesn't have definite

(B) Give a reason for the following :

When the temperature of liquid chocolate decreases, it will freeze.

(A) Write the scientific term of each of the following :

1. It is the energy which cause increasing in the temperature of matter causing its melting. (.....)
2. State of matter which takes the shape and volume of its container. (.....)
3. It is the point in which water is changed from liquid state to solid state at 0°C . (.....)

(B) What happens if ... ?

An amount of melted chocolate is placed in a refrigerator.

Complete the following sentences :



1 state of matter.

2. process.

4. process.



3. state of matter.

5. These two processes are considered from changes.

(A) Complete the following sentences using the words below :

(compounds - heating - condensation)

1. Melting and evaporation take place by
2. Mixture and are formed of two matter or more.
3. We can change water vapor into water by using process.

(B) Give a reason for the following :

We can separate salt that is dissolved in water by boiling water for a long time.

(A) Correct the underlined words :

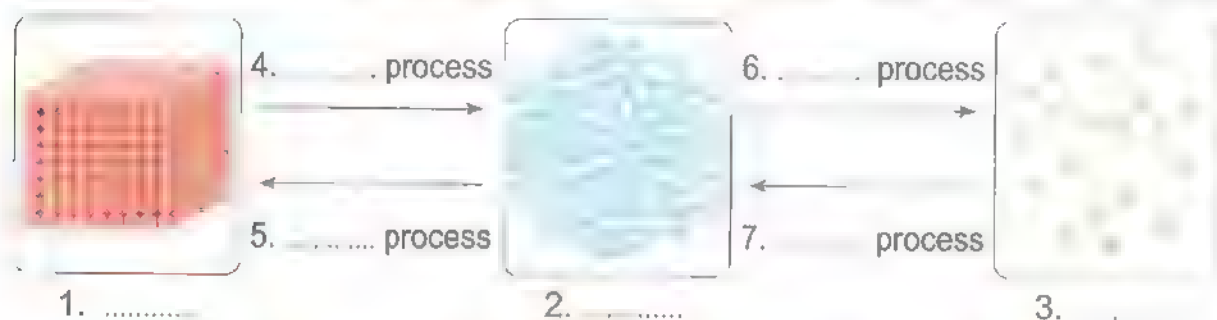
1. Freezing and evaporation take place by decreasing temperature. (.....)
2. Melting process cause the particles of matter to move close to each other. (.....)
3. Fruit salad is considered as a compound. (.....)

(B) What happens to ... ?

The distance between particles of water vapor when it touches a cold surface.

Use the following words to complete the following diagram :

(Evaporation - Water - Melting - Water vapor - Condensation - Ice - Freezing)



Self-Assessment 33 till Lesson 4

(A) Complete the following sentences using the words below :

(mass - shape - gas - properties)

1. When ice melts and changed into water, its will change.
2. Changing of matter from state to liquid state needs cooling.
3. In salty water, the and of salt and water don't change after mixing.

(B) Give a reason for the following :

Formation of ice from water needs cooling.

.....

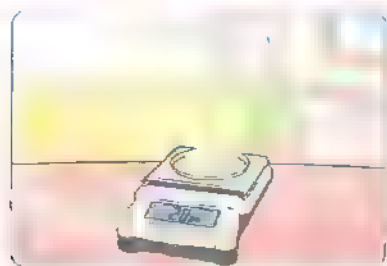
(A) Correct the underlined words :

1. In evaporation process, the particles of matter move slower and spread far from each other. (.....)
2. Changing of matter from liquid state to gas state needs cooling. (.....)
3. Mixing salt and papper form a compound which has the same properties of its components. (.....)

(B) What happens if ... ?

You increase the temperature of ice.

.....

Look at the following figures, then choose the correct answer

Salt figure (A)



Salty water figure (B)

1. The mass of salt in figure (B) equals gm. (20 30 50)
2. The mass of water in figure (B) equals gm. (20 30 50)
3. If we increase the mass of salt in figure (A) to 30 gm and mix it with the same amount of water, so the mass of salt in the new mixture will be gm. (20 - 30 - 50)
4. The taste of salt in figure (B) will
(remain as it is - disappear - change into another taste)

Self-Assessment 34 till Lesson 5**(A) Put (✓) or (X) :**

1. Atmospheric air has definite shape and volume. ()
2. The change of water into water vapor is a physical change. ()
3. When an ice cube is exposed to the Sun, its particles move faster which cause it melts. ()

(B) Give a reason for the following :

Ash is a new substance that is formed after burning of a piece of paper.

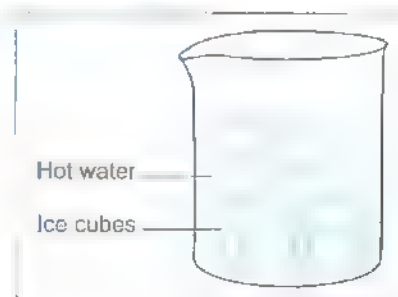
Write the each state of each of the following

1. The type of change that occurs during making bread. (.....)
2. The change of matter from gas state to liquid state by cooling. (.....)
3. The type of change that occurs when cutting an apple into small pieces. (.....)

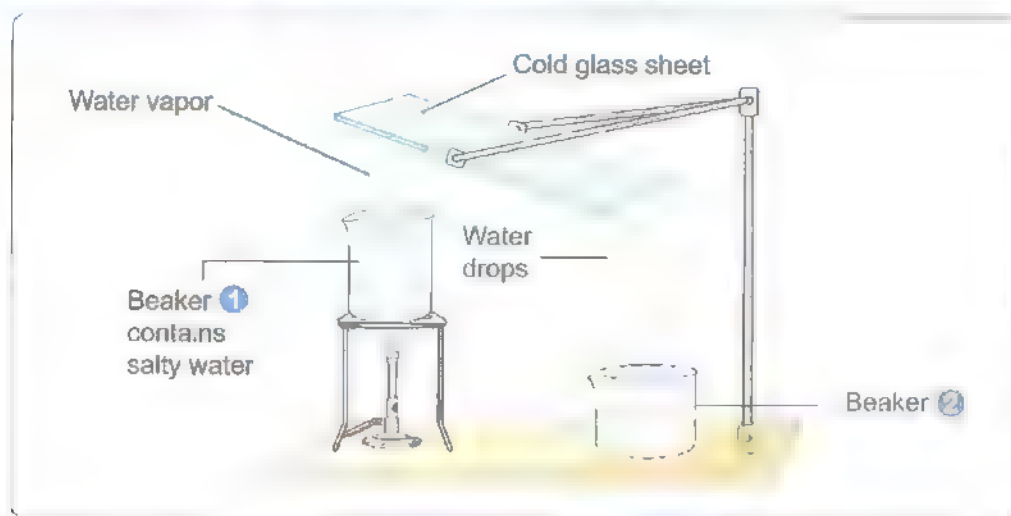
(B) Observe the setup to figure then choose the correct answer.

Which of the following changes takes place in this activity ?

- a. The hot water take heat from the ice cubes.
- b. The hot water changes from liquid to solid.
- c. The ice cubes changes from solid to liquid.
- d. The ice cubes changes from solid to gas.



Look at the following figure, then answer the questions



1. What is the process which takes place in beaker 1 ?
.....
2. What is the process which takes place on the cold glass sheet ?
.....
3. What is the type of change which occurs in the two breakers ?
.....
4. What will be left in break 1 after a long period of time ?
.....

Self-Assessment 35 till Lesson 6

(A) Choose the correct answer :

- Both of processes need increasing in temperature.
 - evaporation and freezing
 - melting and freezing
 - melting and evaporation
 - freezing and condensation.
- Among matter which has definite shape and volume are
 - sugar cube and water.
 - chair and table.
 - air and wood.
 - iron and oxygen.
- Cutting a paper into small pieces causes a change in its
 - shape only.
 - size only.
 - shape and color.
 - shape and size.

(B) Give a reason for the following :

Coloring a paper is considered as a physical change.

.....

(A) Correct the underlined words :

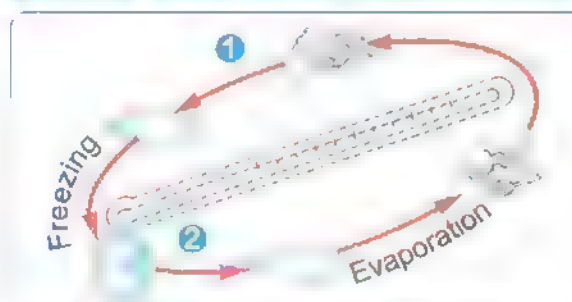
- Boiling of water changes it into solid state. (.....)
- Mixing baking soda with vinegar forms a mixture which has new chemical properties. (.....)
- Producing ash from burning of wood is considered as a physical change. (.....)

(B) What happens if ... ?

You leave a piece of wet iron wire in air for a long period of time.

.....

Look at the following figure, then answer the questions below :



- Number ① is the change of matter from the state to the state.
 - Number ② is the change of matter from the state to the state.
 - Mention the type of change happening in this figure ?
-

Self-Assessment 36 till Lesson 7

1 (A) Choose the correct answer :

1. All the following can pass through filters during desalination of water, except
 - a. salts.
 - b. minerals.
 - c. seaweed.
 - d. gases.
2. On decreasing the temperature of water vapor, it
 - a. freezes.
 - b. condenses.
 - c. melts.
 - d. evaporates.
3. The change produced as a result of coloring a paper is the same change produced from
 - a. rusting of iron.
 - b. mixing baking soda with vinegar.
 - c. mixing iodine with starch.
 - d. melting of wax.

(B) Give a reason for the following :

The water of seas and oceans is considered as a mixture.

(A) Put (✓) or (X) :

1. After desalination process, the water that is returned back to oceans is useful to marine life. ()
2. Dehydration means that human body loses water. ()
3. Gas substances always take the shapes and the volumes of their containers. ()

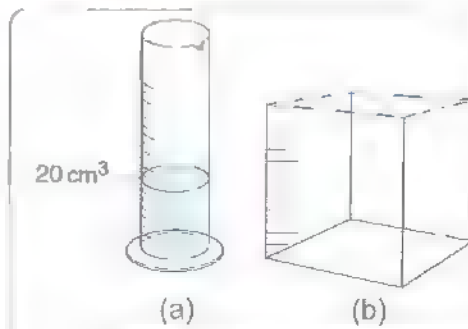
(B) What happens to ... ?

Movement of ice particles, when it is exposed to Sun rays for a short period of time.

 Look at the opposite figure, then answer the questions below :

During pouring the water from container (a) into container (b) :

- Does the volume of water change ?
a. Yes. b. No.
- Does the shape of water change ?
a. Yes. b. No.
- What is the change that happens to the water ?
a. Physical change. b. Chemical change.



Model Exam

on Theme (2)

Total mark

20

(A) Choose the correct answer .

1. We can measure the mass of an ice cube by using a
a thermometer. b ruler. c measuring cup. d balance.
2. Ice can be turned into water by
a. cooling. b. freezing. c. rusting. d. heating.
3. Both ... and ... are solids as they have definite shape and volume.
a. wood – oxygen b. milk – iron
c. wood – iron d. milk – oxygen
4. To separate sand only from salty water, we can use _____ process.
a. filtration b. evaporation c. melting d. freezing

(B) Give a reason for the following :

Sometimes we need to use an electron microscope.

(A) Complete the following sentences using the words below :

(ceramic tiles – globe – rough – solid)

1. You can describe the texture of sugar crystals by saying "it has _____ crystal texture".
2. We can study the location of countries by using a which represents a model of the Earth.
3. The distance between particles of water is very small in case of its _____ state.
4. In Earth's polar zone, people use _____ in building their home roofs to protect them from rains.

(B) What happens if ... ?

A piece of chocolate is exposed to Sun ray for a period of time.

(A) Cross out the odd word :

(5 marks)

1. Milk – Oil – Ice – Apple juice. (.....)
2. Rusting of iron – Coloring a paper – Burning of wood –
Burning of a paper. (.....)
3. Mixing salt with water – Mixing vinegar with water – Mixing sugar
with water – Mixing vinegar with baking soda. (.....)
4. Cutting a piece of paper – Melting of wax – Freezing of water
– Rusting of iron. (.....)

(B) Write the scientific term of each of the following :

1. A state of matter that its particles move faster than solids and have a definite volume only. (.....)
2. It is the amount of space that matter takes up. (.....)

 (A) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Milk	a. its particles are packed tightly.
2. Air	b. its particles have medium energy.
3. Wood	c. its particles move very freely.
	d. its particles don't move at all.

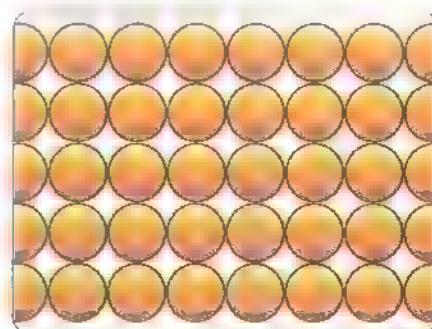
1.

2.

3.

(B) Look at the opposite model that shows the particles of a substance, then complete the following sentences :

1. This model represent a substance in .. state.
2. If we want to make changes in this model to show this substance in a liquid state, we should the distance between balls.



PART

2

Final Examinations!

How I Doing On The First Term.



El-Moisser Final Examinations:

100% **FREE** **DELIVERY**

1 (A) Choose the correct answer :

1. Plants take from the air to make its own food.
a. water
b. oxygen gas
c. carbon dioxide gas
d. sugar
2. A community that includes living organisms and non-living things is known as
a. digestive system.
b. respiratory system.
c. ecosystem.
d. vascular system.
3. When the marine habitats are destroyed, the number of living organisms in their food webs is
a. increased.
b. decreased.
c. not changed.
d. doubled.
4. Some liquids come out of a during its eruption.
a. star
b. wooden piece
c. volcano
d. plastic piece

(B) Give a reason for the following :

The roof of desert home is made of strong stones.

[illegible]

(A) Put (✓) or (X) :

1. We can describe a solid matter by its color and shape. ()
2. The mass and properties of oil will change when mixing it with vinegar. ()
3. Particles of all matter are in a continuous motion. ()
4. Xylem helps the plant to get water from the soil. ()

(B) What happens if ... ?

A plant is placed in a dark place for many days.

1. *Journal of the American Medical Association*, 1997; 277: 1001-1005.

1. Throwing plastic garbage and waste materials into a river causes water
2. Both organisms and organisms cannot produce their own food.
3. Without in the leaves of plants, gases can't move in or out of the plant.
4. Melting of wax is a change, while burning of wood is a change.

(B) Cross out the odd word :

1. Oil – Milk – Water – Wood. (.....)
2. Roots – Stems – Leaves – Sunlight. (.....)

(A) Correct the underlined words .

1. Chlorophyll in plant's roots absorbs energy from the sunlight. (.....)
2. Coconut seeds disperse by wind. (.....)
3. Flowers of plants produce root hairs that help the plant to reproduce. (.....)
4. Respiration process helps the plant to make its own food. (.....)

(B) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Carbon dioxide	a. is not a matter.
2. Sand	b. is a liquid matter.
3. Gasoline	c. is a gas matter.
	d. is a solid matter.

1.

2.

3.

Model Exam 2

(A) Complete the following sentences .

1. When we heat an ice cream, it and becomes liquid.
2. Digestion of food forms a new which has new
3. We can use in making hammers because it is and strong.
4. You can use a to measure the mass of matter, while you can use a to measure its temperature.

(B) What happens to ... ?

The speed of particles of an ice cube when it is exposed to the Sun.

.....

.....

(A) Write the scientific term of each of the following :

1. It is the number of organisms of one type of species living in an area. (.....)
2. The animal that is eaten by another animal. (.....)
3. The liquid substance that plants, animals and human need to survive. (.....)
4. A part of the plant that fix it in the soil. (.....)

(B) Give a reason for the following :

Human needs to eat some animals and plants.



(A) Choose a word from column (A), which suits a match in column (B).

(A)	(B)
1. Condensation	a. is the change of water from solid state to liquid state.
2. Melting	b. is the change of water from gas state to solid state.
3. Freezing	c. is the change of water from gas state to liquid state.
4. Evaporation	d. is the change of water from liquid state to gas state.
	e. is the change of water from liquid state to solid state.

1.

2.

3.

4.

(B) Correct the underlined words :

1. Due to rising of water temperature, coral reefs turn completely into green.

(.....)

2. Tree trunks are climb stems.

(.....)



(A) Form a food chain by using the given words between brackets,

then complete the sentences below :

(Duck – Grasses – Fox)

(1)

(2)

(3)

a. This food chain doesn't contain consumer.

b. Living organisms that break down materials of dead organisms in this food chain are called

c. Grasses change the energy of the Sun into energy during photosynthesis process.

(B) Cross out the odd word :

1. Carbon dioxide gas – Water – Oxygen gas – Sunlight

(.....)

2. Wood – Iron – Oxygen – Plastic.

(.....)

Model Exam 3

(A) Put (✓) or (x) :

1. Air enters plants through roots. ()
2. People and engineers must share scientists in restoration ecology. ()
3. If coral reefs are destroyed, many marine food chains will be destroyed. ()
4. Vinegar and frozen vegetables have definite shape. ()

(B) What happens if ... ?

A magnet is put close to an iron nail and a plastic spoon.

.....

(A) Complete the following sentences using the words.

(extinction – overfishing – shelter – toxic – predator)

1. Healthy natural resources include clean air, healthy food, water and suitable
2. The human activity that directly decreases the marine population is known as
3. Habitat loss does not only cause a decrease in the marine population but also it is one of the main reasons for
4. When a sea turtle eats a jellyfish, this means that the sea turtle is a living organism.
5. Plastic waste materials are very harmful to marine organisms, because they are and sharp.

(B) Correct the underlined words :

1. There are tiny holes on the stem to allow gases passes into the plant. (.....)
2. Plant's leaves help it to be fixed in the soil. (.....)

(A) Write the scientific term of each of the following.

1. It is a process by which a matter is changed from solid to liquid state. (.....)
2. The property of matter which is measured by the measuring cup. (.....)
3. A model of the whole world that is made in the shape of a large ball. (.....)
4. They are consumers which feed on secondary consumers. (.....)

(B) Give a reason for the following :

Ice is turned into water when it is placed in a warm room.

(A) Choose the correct answer :

- The primary source of energy for all living organisms on the Earth, is
 - the Sun.
 - green plants.
 - glucose sugar.
 - photosynthesis process.
- The marine food web usually started with
 - clam.
 - algae.
 - zooplankton.
 - parrotfish.
- The movement of particles of water are slower than that of
 - wood.
 - plastic.
 - air.
 - gold.
- Steel is used in making hammers, because it is
 - flexible.
 - smooth.
 - hard.
 - transparent.

(B) Adam plants a flowering plant in a pot. He put this plant in a soil rich in nutrients and water it everyday, he used to cover this pot everyday with a carton box to hide it from his brother, after many days, do you think that this plant will survive ? And why :

- a. Yes, because it has nutrients and water.
- b. No, because it needs air and light.
- c. No, because plant doesn't need water and soil.
- d. Yes, because it can survive without sunlight.



World Exam

 (A) Write the scientific term of each of the following :

1. The process of producing new plants. (.....)
2. A group of living organisms that can produce their own food. (.....)
3. Flying living organisms that build their nests on the top of mountain cliffs and dive deeply into the sea to eat. (.....)
4. The state of matter that has definite volume and shape. (.....)

(B) Give a reason for the following :

Balloons and blimps filled with helium always rise up in the air.

(A) Put (✓) or (X) :

1. Healthy habitats provide living organisms with clean air, healthy food and water. ()
2. When particles of a matter absorb thermal energy, they move slower. ()
3. Dead organisms don't need energy. ()
4. From the chemical properties of helium is that it is not flammable. ()

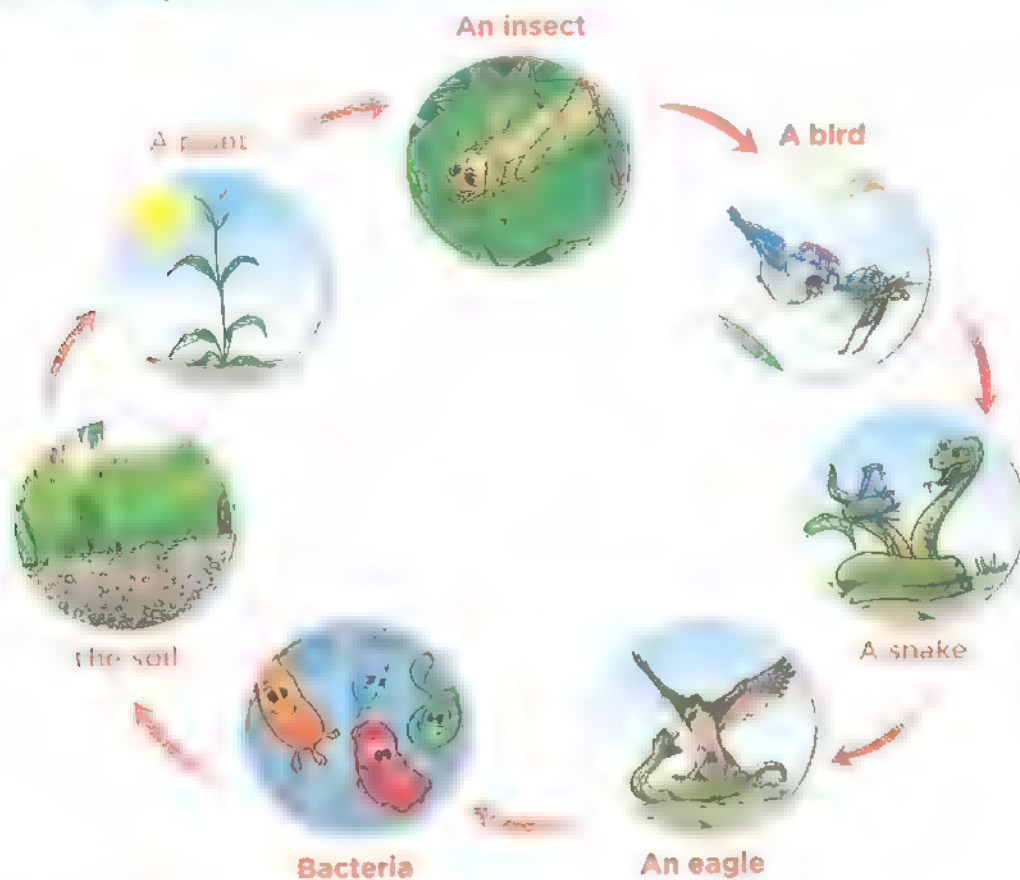
(B) What happens if ... ?

Plants have no stems.

.....

.....

(A) Study the following figure, that shows the recycling nutrients back into the soil, then complete the sentences below :



1. Photosynthesis process is done by, so it is a producer.
2. Decomposition process is done by, so they are decomposers.
3. The insect is a consumer, because it eats the plant.
4. The large meat-eating animal is the
5. When the eagle dies, its nutrients return back to the soil with the help of

(A) Choose from column (B) and use the numbers.

(A)	(B)
1. Sunlight	a. is absorbed by the roots of the plant.
2. Soil	b. is necessary for plant's growth.
3. Water	c. is not a basic need for plant growth.
4. Oxygen	d. a gas which is produced during photosynthesis process.
	e. a gas which is the plant uses during photosynthesis process.

1.

2.

3.

4.

4 (A) Choose the correct answer :

- When the plant seed begins to grow and makes sprouts this process is called
a. respiration. b. germination. c. absorption. d. reproduction.
- Decomposers always the soil.
a. pollute b. damage c. benefit d. harm
- The amount of energy that transfers between living organisms in a food web, is
a. 10% b. 90% c. 30% d. 100%
- We can use a model to study very large things such as
a. solar system. b. germs. c. microbes. d. viruses.

(B) Look at the opposite figure then put (✓) or (X)

- Label (1) refers to a matter in liquid state. ()
- Label (2) refers to a matter in solid state. ()
- Label (3) refers to a matter that its shape and volume don't change. ()
- Particles of matter (1) move slower than particles of matter (3). ()



Model Exam 5

1 (A) Choose the correct answer :

- The volume of one liter of water has a mass of
a. one gram. b. one kilogram.
c. one milliliter. d. one cubic centimeter.
- When the water is heated, its particles
a. move slower. b. move faster.
c. move with the same speed. d. do not move.

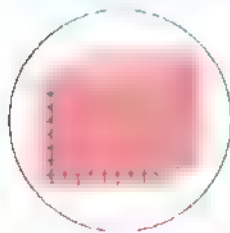
3. Salt can be separated by of salty water.

- a. melting b. evaporation c. freezing d. condensation

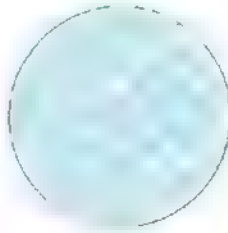
4. In plant's leaves, light energy is converted into energy during photosynthesis.

- a. sound b. electric c. chemical d. kinetic

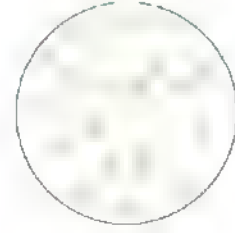
(B) Study the following figures and state whether they are different states of matter then put (✓) or (X) :



(1)



(2)



(3)

1. Figure (1) represents solid matter. ()
2. Figure (2) represents liquid matter. ()
3. By increasing the spaces between the particles of figure (2), it may change into solid state. ()
4. Particles of figure (1) have more energy than particles of figure (3). ()

(A) Complete the following sentences

1. An area that provides food, water and shelter to all living organisms which live in it, is known as
2. According to temperature, matter can be classified into and objects.
3. Helium is not or, so it is considered as a safe gas.
4. Without in the leaves of plants, gases can't move in or out of the plant.

(B) Give a reason for the following :

When the temperature of ice cubes increases, they will melt.

.....

(A) Write the meaning of the following

1. They are changes in matter which are usually reversible and don't affect its structure. (.....)
2. It is the process by which matter changes from liquid state to gas state. (.....)
3. A tool is used to measure the length of wall. (.....)
4. They are consumers that exist at the top of food chains. (.....)

(B) What happens if ... ?

Plant's leaves don't contain chlorophyll.

(A) Put (✓) or (X) :

1. Producers and consumers use carbon dioxide gas for making their food. ()
2. Ecosystem can be effected by climate changes, pollution and human activities. ()
3. Air particles are visible as they are very large particles. ()
4. Iron spoon is attracted to the magnet. ()

(B) Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Photosynthesis process	a. it is a process in which the blood carry oxygen to all body parts.
2. Decomposition process	b. it is a process in which the nutrients are returned to the ecosystem.
	c. it is a process through which producers make their own food.

1.

2.

Model Exam 6

(A) Complete the following sentences :

1. The food of plant is a type of which is made in their by photosynthesis process.
2. Sunligh energy converts and into glucose inside the plant's leaves.
3. Heavy rain causes which destroys desert ecosystems.
4. According to hardness of matter, a sponge and a feather are examples of matter, while a coin and a brick are examples of matter.

(B) Give a reason for the following :

The roof of tropical rainforest home is made of leaves and sticks.

(A) Choose the correct answer :

1. Which of the following matter has a definite volume and shape ?
a. Water. b. Milk. c. Ice. d. Air.

2. In the presence of Sun and water, the seeds can germinate at the beginning of growth without the need of
 a. soil. b. rocks. c. insects. d. dry paper towel.
3. Which of the following living organisms can make their own food ?
 a. Hawks. b. Mice. c. Pine trees. d. Caracals.
4. If all grasses were removed completely from an ecosystem, rabbits in this ecosystem will
 a. increase. b. decrease. c. die. d. not be affected.

(B) Cross out the odd word :

Plastic – Vinegar – Iron – Aluminium.

(.....)

(A) Put (✓) or (X) :

1. We can differentiate between sugar and flour by texture. ()
2. When a solid matter gains thermal energy, it will change into liquid state. ()
3. Plants and humans are similar in the way of getting food. ()
4. Human can eat plants and animals. ()

(B) What happens to ... ?

The microorganisms if the seawater becomes warm.

(A) Write the scientific term of each of the following :

1. The building unit of matter. (.....)
2. It is a measure of the amount of matter. (.....)
3. It is the process by which matter changes from gas state to liquid state. (.....)
4. Parts of the plant where sunlight allows carbon dioxide to combine with water during photosynthesis process. (.....)

(B) Choose from column (B) what suits it in column (A) .

(A)	(B)
1. Photosynthesis process	a. It produces nutrients, which is important for soil fertility.
2. Respiration process	b. It produces light, which is important for plants.
3. Decomposition process	c. It produces oxygen gas, which is important for breathing.
	d. It produces carbon dioxide gas, which is important for plants.

1.

2.

3.

11) Write the correct term at the end of the following:

1. A human activity that leads to decreasing the number of fish and affecting many marine food webs. (.....)
2. The gas that is produced from photosynthesis process. (.....)
3. The process that takes place inside plants through which we can get oxygen. (.....)
4. A property of matter by which we can distinguish between hot and cold objects. (.....)

(B) What happens to ... ?

The temperature of a matter if the speed of its particles decreases.

.....

.....

.....

12) (A) Put (✓) or (X) :

1. We can use thermometer to measure the temperature of a hot cup of tea. ()
2. If we increase the temperature of some pieces of ice, they will melt. ()
3. Photosynthesis process takes place in the plant roots. ()
4. The first link in any food chain is a consumer. ()

(B) Give a reason for the following :

Chlorophyll in plant's leaves has an important role in photosynthesis process.

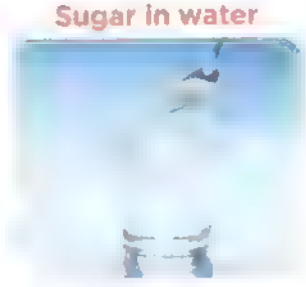
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.....

13) (A) Complete the following sentences :

1. In a food chain, the energy flows from consumer to a secondary consumer.
2. Particles of liquid matter can move more faster than matter and move slower than matter.
3. We can use gas to fill blimps, because it is lighter than
4. When two substances combine and form a new substance, this new substance is called a

(Solid and liquid – Gas – Solid – Liquid)



4..... materials

- All of the following materials can reach the plant's leaves, except ..
a. nutrients.
b. carbon dioxide gas.
c. water.
d. soil.
- A snake is a predator for mice, while snake is considered as a prey for
a. rabbit.
b. frog.
c. eagle.
d. deer.
- Which of the following two living organisms don't have direct food relationship between them ?
a. Parrotfish and shark.
b. Butterflyfish and shark.
c. Triggerfish and shark.
d. Eagle and shark.
- Oil takes the of its container.
a. volume
b. shape
c. color
d. mass

- 67

Model Exam 8

(A) Put (✓) or (X) :

1. Phloem transports food materials downward from the leaves to other parts of the plant. ()
2. In an ecosystem that contains rabbits, mice, eagles and snakes only, if snakes disappear completely, so eagles will disappear completely. ()
3. A desert food chain doesn't contain any type of fish. ()
4. A model of an airplane shows us how it flies up into the air. ()

(B) Give a reason for the following :

Human can use helium gas safely.

.....

(A) Choose the correct answer :

1. Condensation changes the matter from state to state.
a. solid – liquid b. liquid – gas c. gas – liquid d. liquid – solid
2. The green plants can make their own food through
a. roots. b. leaves. c. stems. d. flowers.
3. Any food chain started with
a. insects. b. plants. c. fungi. d. bacteria.
4. If the climate change is suitable, the population of a species will
a. increase. b. decrease. c. die. d. not be affected.

(B) What happens if ... ?

A liquid changes into gas. (according to the speed of particles).

.....
.....

(A) Write the scientific term of each of the following :

1. The ability of materials to transfer heat and conduct electricity. (.....)
2. A matter that is formed when two or more materials combine chemically. (.....)
3. Narrow holes spread on the surface of plant's leaves that allow gases to come in and out the plant. (.....)
4. They are organisms that feed on the dead organisms bodies and break them down into smaller pieces. (.....)

2.1 Properties of Matter (Physical and Chemical)

(chemical – physical – rough – odor)

1. Both of odor and texture of matter are considered from the _____ properties of matter.
2. You can identify the _____ of a juice by using the sense of smell.
3. We can describe the texture of sugar crystals by saying "it has _____ crystal texture".
4. The ability of a piece of iron to rust is from the _____ properties of matter.

(B) Give a reason for the following :

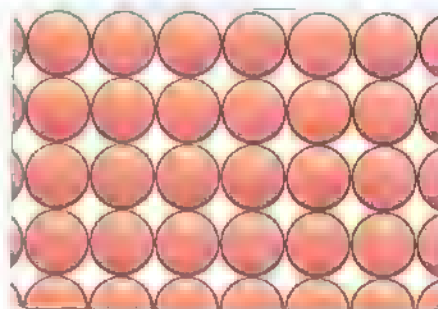
Both melting and freezing processes are considered as physical changes.

(A) Put (✓) or (X) :

1. Plant's stem has hairs that absorb oxygen gas from the air. ()
2. Birds are secondary consumers, because they eat insects that feed on plants. ()
3. Microorganisms are producers that small fish feed on to get energy. ()
4. The speed of water vapor particles is greater than that of water particles. ()

(B) Look at the opposite model that shows the particles of a substance, then complete the following sentences :

1. This model represent a substance in _____ state.
2. If we want to make changes in this model to show this substance in a liquid state, we should _____ the distances between balls.



(A) Write the scientific term of each of the following :

1. The property of matter which is measured by the balance. (.....)
2. The state of water when its temperature is located between 0°C and 100°C. (.....)
3. A substance that is produced from the plant during photosynthesis process and provides it with its needed energy. (.....)
4. The consumer who eats another animal. (.....)

(B) Put letter (P) in front of physical properties and letter (C) in front of chemical properties of the different matter below :

1. The white color of milk. (.....)
2. The ash produced from burning a paper. (.....)
3. The large crystals of salt particles. (.....)
4. The odor of perfume. (.....)

Model Exam 10

(A) Put (✓) or (X) :

1. Light is important for plant growth. ()
2. Water and carbon dioxide are absorbed by plant's root to help the plant to grow. ()
3. Light and sound are forms of matter. ()
4. Liquids don't take the shape of the container that they are placed in. ()

(B) Correct the underlined words :

1. Humans can get their food from air and animals. (.....)
2. Oxygen gas is absorbed by plant's leaves to make photosynthesis process. (.....)

(A) Write the scientific term of each of the following

1. A device used to examine one tiny particle such as a blood cell. (.....)
2. The scientists who measure the size and shape of fossils. (.....)
3. The process by which plant can make its own food. (.....)
4. A part of the plant that fix it in the soil. (.....)

(B) Give a reason for the following :

Wood has definite shape and volume.

.....

(A) Complete the following sentences :

1. In the matter, the volume and shape don't change.
2. Water evaporates when it is exposed to a temperature.
3. You can use a ruler to measure the of your book, while you can use a balance to measure its
4. If an iron cube and an amount of cotton have the same mass, so the volume of is smaller than that of the

(B) What happens to ... ?

The size of a balloon when you blow it up.

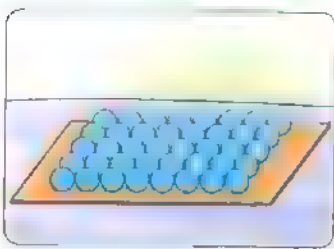
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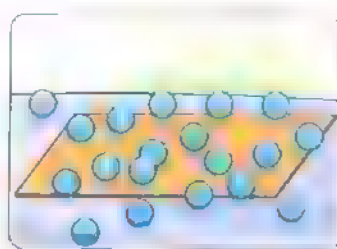
 (A) Choose the correct answer :

- We can measure the mass of a cube of ice by using a
 a. thermometer. b. ruler.
 c. measuring tape. d. balance.
- We can identify milk by determining its
 a. color and texture. b. shape and odor.
 c. color and taste. d. color and size.
- To separate sand from salty water, we can use process.
 a. filtration b. evaporation c. melting d. freezing
- The of plant get water and nutrients from the soil.
 a. roots b. stems c. leaves d. flowers

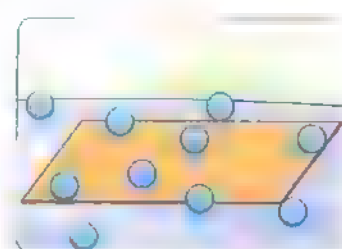
(B) The following figures show three models of particles of some matter related to our planet Earth. Observe the figures carefully, then complete the following sentences :



(1)



(2)



(3)

- Beads of figure could represent the particles of a rock on the Earth's surface.
- Beads of figure could represent the particles of river water on the Earth.

PART

3

Projects :

- Unit One Project.
- Interdisciplinary Project.
- Unit Two Project.



UNIT ONE Project

Build a Miniature Ecosystem

- In this project, you will build a "Miniature Ecosystem" which means a very small ecosystem using simple tools and materials.
- Your miniature ecosystem will include some nonliving things and also some different living organisms that represent producers, consumers and decomposers to show how energy transfers among living organisms in an ecosystem.

Note

In your miniature ecosystem, you have to get real living Beetles and Earthworms that you may find them in gardens or your surrounding environment, also you can buy them from pets shops.

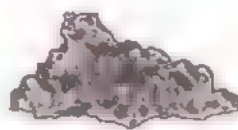
Materials



Large plastic bottle



Scissors



Soil



Water



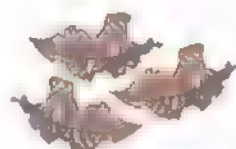
Bean seeds



Beetles



Earthworms



Dead leaves



2 Rubber bands



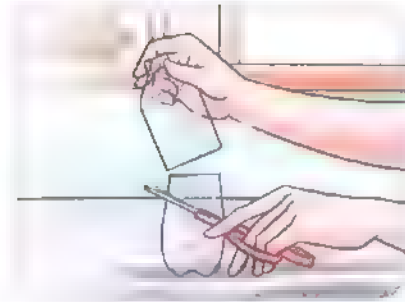
Small piece of cloth



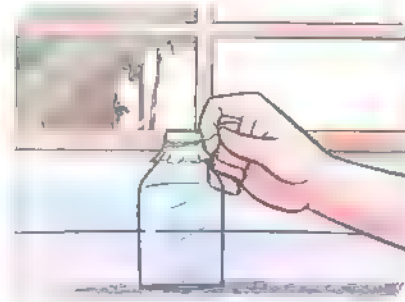
Piece of cloth with smal. holes

Steps

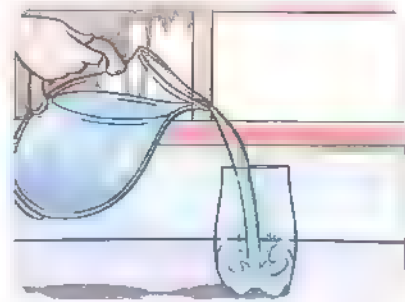
- 1 Cut the plastic bottle into two halves using the scissors as shown.



- 2 Cover the opening of the upper part of the bottle with the small piece of cloth and fix it tightly with a rubber band.



- 3 Pour some water in the lower part of the bottle.



- 4 Invert the upper part of the bottle into the lower part as shown (the water should cover the piece of cloth).



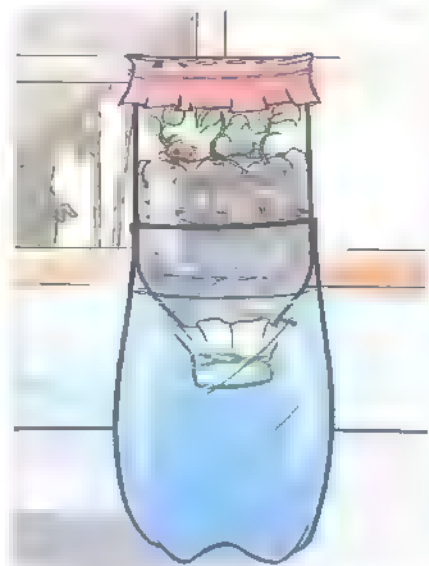
- 5 Put some soil in the upper part and plant the bean seeds in it, then put the project in a sunny place.



- ⑥ When the bean seeds begun to grow up, add the dead leaves, earthworms and beetles into the upper part.



- ⑦ Close the upper part of the bottle using the piece of cloth with small holes and fix it tightly with a rubber band.



► Now, you have made your miniature ecosystem that contains different living organisms and nonliving things, where :

- Soil and water are nonliving things.
- Bean plants represent producer organisms.
- Beetles represent consumer organisms.
- Earthworms represent decomposer organisms.
- Dead leaves represent dead organisms.

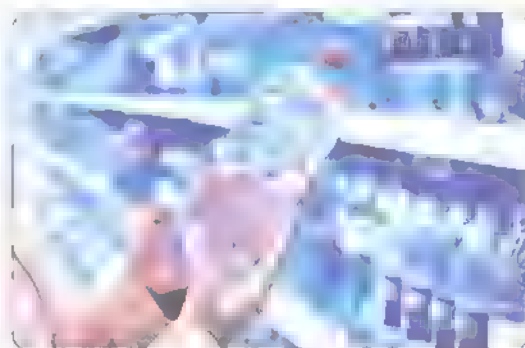
INTERDISCIPLINARY Project

Waste Not, Want Not

- Plastic is a common material that we always use in our lives in many purposes such as :

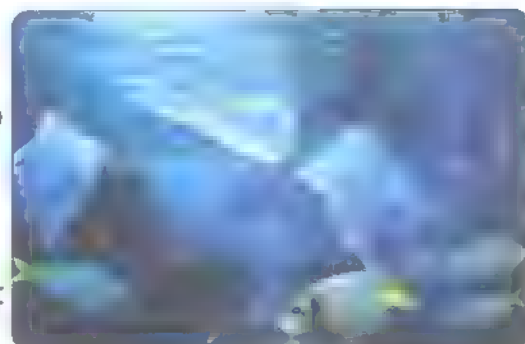
- Packing and storing our food.
- Transporting water.
- Manufacturing some medical tools.

- However, much of the plastic we use are thrown away. Plastic bags and water bottles are the most items that people throw into the environment.



- As you have learned that plastic is one of the most harmful waste because it is especially dangerous to animals, for example :

In the River Nile, scientists have found that most of the fish have swallowed plastic caused by human pollution and this leads to death of fish.



- Humans try to decrease the bad effects of plastic on the environment in different ways, such as :

- Collecting plastic trash along the shore.
- Reusing the plastic items instead of throwing them.

- In this project, use the steps of the **Engineering Design Process** that you have learnt in the previous educational grades to create a design of a "Mini-garden" at your home using empty plastic bottles.



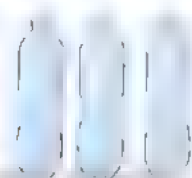
Idea

Create a "Mini-garden"
using empty plastic bottles.



Materials

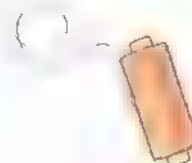
You may use the following materials to build up your design:



Empty plastic bottles



Scissors



Thread



Wax gun



Soil



Different seeds

Plan

Build

Draw your "Mini-garden" design.



Improve

Write down your ideas to improve your "Mini-garden" design.



UNIT TWO Project

Slippery Sands

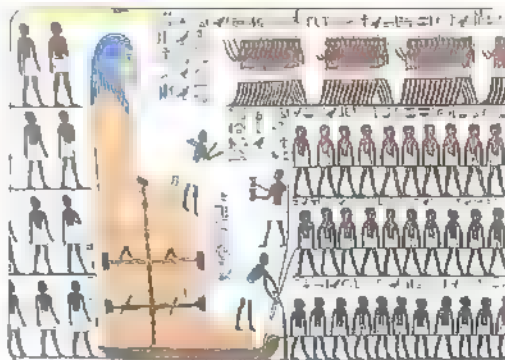
In this project, you will make a research about how water can be used to make sand more slippery.

► **Read the following paragraph :**

- Scientists and historians have been wondering how the ancient Egyptians were able to move very large blocks of stones across the desert sands. Many scientists and historians have tried to find the answer of this question.

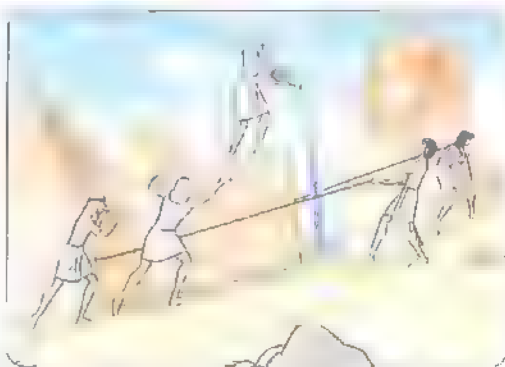
• **Historians :**

- Historians have looked at one of the ancient Egyptians wall painting that shows how did they move a huge statue across the desert sands.
- In the wall painting, historians have observed a person pouring a liquid from a jar in front of the sled. Historians believed that this was related to a holy ceremony.



• **Scientists :**

- Scientist looked at the same painting in a different way.
- Scientist had a theory that may be ancient Egyptians were adding water to the sand to make the sand more slippery, so they could move the huge statue more easily because the friction between the sled and the wet sand were decreased.
- Scientists said that sand particles are rough, but when water is added to sand, this makes the sand particles come close and stick together and this leads to decreasing the friction between sand particles and any object move on it.



- Use the previous paragraph or online sources to write your claim, evidence and scientific explanation for the following question.



The Question

Does adding water to the sand make the sand more slippery ?



My Claim



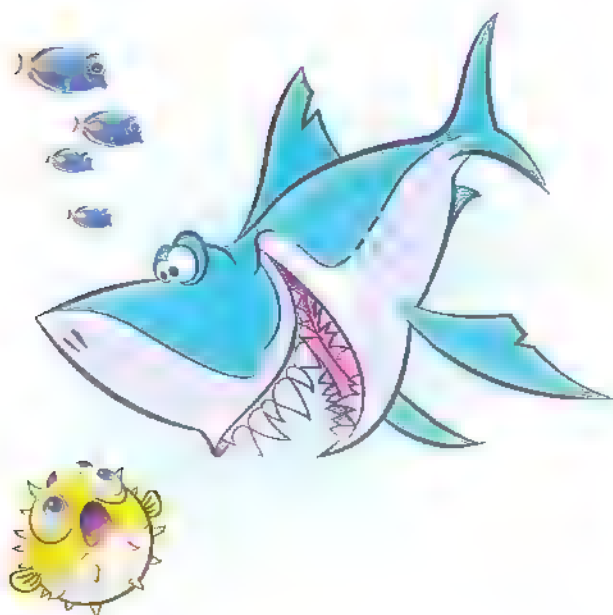
My Evidence



My Scientific Explanation

NOW

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**Guide Answer of
Final Examinations**

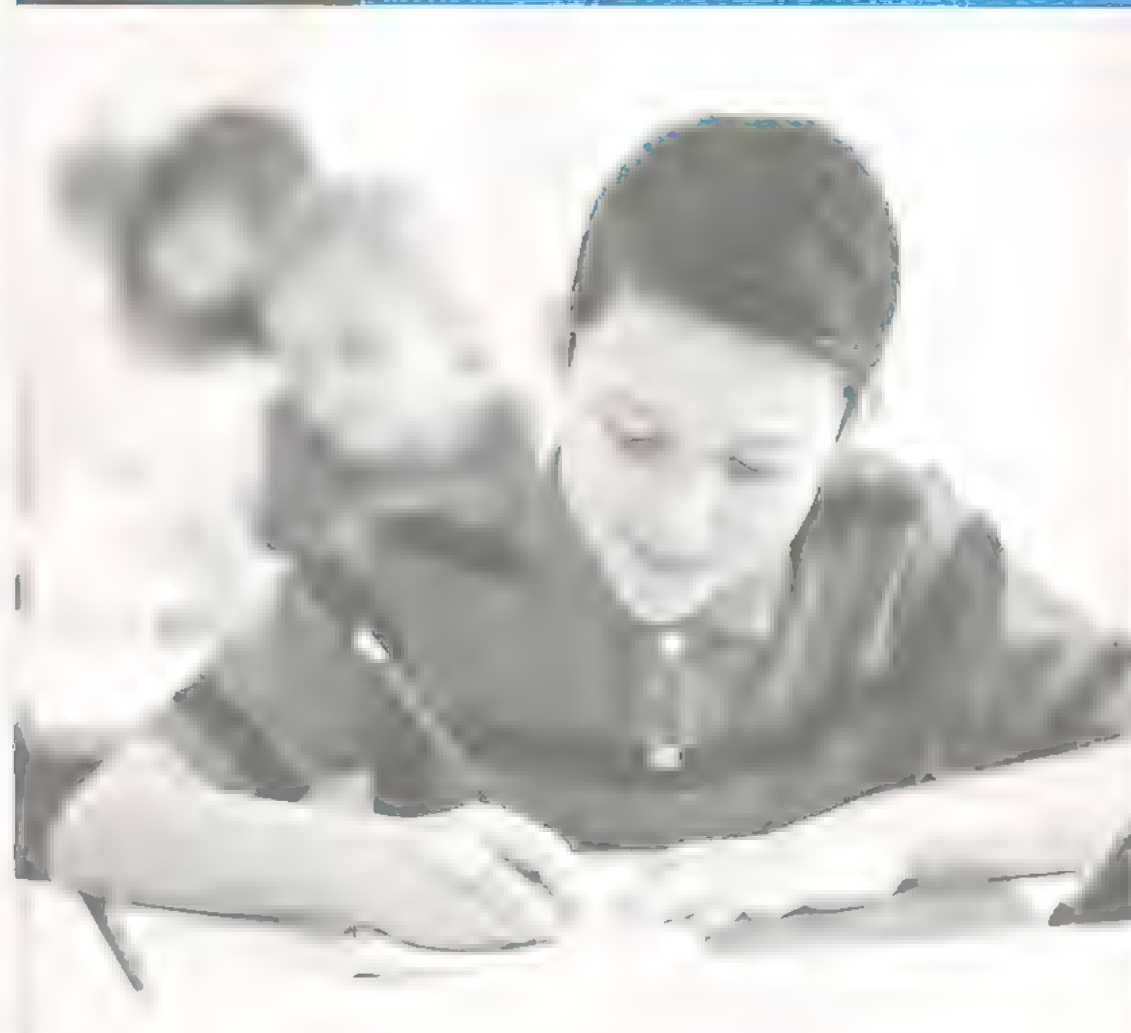
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Part

1

**Guide Answers of
Exercises on Lessons**



UNIT ONE : Interactions of Organisms

EXERCISES ON LESSONS

Concept (1.1)

Exercises on Lesson 1

1. d 2. a 3. b 4. c
5. b 6. b 7. c 8. c
9. a 10. b

1. (x) 2. (✓) 3. (✓) 4. (x)
5. (✓) 6. (✓) 7. (✓) 8. (x)
9. (x) 10. (✓)

1. leaves – roots.
2. water – nutrients – roots.
3. photosynthesis – leaves.
4. roots – leaves
5. the Sun
6. sugar – leaves
7. water
8. the soil

1. Carbon dioxide gas.
2. Water. 3. The stem.
4. Photosynthesis process.
5. Oxygen gas. 6. The Sun

1. Oxygen gas (all items are plant's needs to grow, while oxygen gas is released during photosynthesis process).
2. Sunlight (all items are parts of the plant, while sunlight is important for plant growth).

1. Because the roots help the plant to get water and nutrients from the soil.

2. Because it helps the plant to make its own food.
3. Because :
• Some plants only grow in the water
• Some plants grow on other plants instead of having roots in the soil.

1. Water and nutrients will not be carried from the roots to the leaves.
2. Plants can't make their own food during photosynthesis process.
3. Plant's leaves will be yellow and can't make photosynthesis process.

1. b 2. c 3. a 4. d

- b.

Exercises on Lesson 2

1. b 2. d 3. b 4. a

1. (x) 2. (✓) 3. (x) 4. (x)
5. (x)

- a. germination. b. soil

1. It will germinate and grow well.
2. It will germinate and make sprouts for a while then it will die.

1. figure (A) – figure (B).
2. soil

Exercises on Lesson 3

1. c 2. d 3. d 4. c
5. b 6. c 7. a 8. d
9. c 10. d

1. d 2. e 3. b
4. c 5. a

1. (x) 2. (x) 3. (✓) 4. (x)
5. (x) 6. (x) 7. (✓) 8. (✓)
9. (x) 10. (x) 11. (✓)

1. Photosynthesis process.
2. Plant's leaves.
3. Xylem. 4. Stomata.
5. Carbon dioxide gas.
6. Sugar.

1. Photosynthesis
2. Carbon dioxide
3. dark green 4. plants
5. roots 6. the stem
7. leaves 8. gases

1. carbon dioxide gas – oxygen
2. water – roots.
3. the energy 4. xylem
5. stomata
6. water – sunlight
7. stomata
8. water – the leaves.

1. To allow gases to move into and out of the plant.

2. Because they can make photosynthesis process.
3. Because they transport water and nutrients to the plant's leaves

1. Gases can't move into or out the plant's leaves and the plant will die.
2. The plant can't make photosynthesis process and it will die.

1. Carbon dioxide gas
2. Sunlight 3. Sugar
4. Oxygen gas 5. Water
6. Minerals

Exercises on Lesson 4

1. c 2. b 3. c 4. b
5. c 6. a 7. b 8. c
9. c 10. b 11. a 12. b

1. (✓) 2. (x) 3. (x) 4. (x)
5. (✓) 6. (x) 7. (x) 8. (✓)
9. (x) 10. (x) 11. (✓) 12. (✓)
13. (✓)

1. Root hairs. 2. Plant's roots.
3. Plant's stem. 4. Climb stems.
5. Runners. 6. Potato plant.
7. Chlorophyll. 8. Phloem.
9. Oxygen gas.

- 1** 1. roots 2. root hairs
3. wood 4. tubers
5. runners 6. upright
7. oxygen 8. narrow
9. leaves 10. Phloem

- 2** 1. root hairs – water
2. climb stem – tubers
3. fix – nutrients
4. wood – upright
5. runners.
6. narrow needles.
7. sugars – proteins
8. photosynthesis – phloem.
9. chlorophyll – the sunlight

- 6** 1. Because plants produce oxygen gas during photosynthesis process which is important for all living organisms to breathe.
2. Because chlorophyll absorbs the energy of sunlight that helps the plant to make photosynthesis.
3. To increase the amount of water that the plant absorbs

- 7** 1. The plant can't absorb the energy of sunlight and can't make photosynthesis.
2. The plant can't absorb water from the soil and also can't be fixed in the soil.
3. It can't make its own food and will die.

- 3** a. red. b. xylem.

- 4** (c)

Exercises on Lesson 5

- 1** 1. c 2. a 3. b 4. c
5. c 6. b 7. c 8. d
9. d 10. b

- 2** 1. (x) 2. (✓) 3. (x) 4. (x)
5. (✓) 6. (x) 7. (✓) 8. (✓)

- 3** 1. seeds 2. arteries
3. heart 4. one – way
5. Xylem 6. Arteries
7. chemical
8. photosynthesis

- 4** 1. Glucose. 2. Arteries.
3. Veins.
4. Circulatory system.
5. Transport system.
6. Flowers.
7. Plant reproduction.

- 5** 1. glucose
2. the leaves – the nose – the mouth
3. the heart – blood vessels.
4. glucose – the body cells.
5. circulatory 6. leaves
7. xylem – phloem.
8. heart – xylem – roots
9. light – chemical
10. seeds reproduce.
11. arteries – veins.

- 6** 1. Because flowers produce seeds for the plant that help the plant to reproduce.
2. Because it transports blood and other fluids through the body.
3. Because xylem carry water and nutrients from the roots to the leaves.

- 7** 1. Plants can't get their needed energy to survive and grow.
2. Humans can't transport blood and other fluids throughout the body.
3. The plant can't produce seeds for reproduction.

- 8** a. 1) Artery. 2) Vein.
b. ② – ①
c. c

Exercises on Lesson 6

- 1** 1. b 2. d 3. a 4. c
5. d

- 2** 1. b 2. d 3. a 4. c

- 3** 1. (✓) 2. (x) 3. (✓) 4. (✓)
5. (x) 6. (x) 7. (✓)

- 4** 1. water 2. spiny
3. apple

- 5** 1. coconut – maple (dandelion)
2. spines. 3. light seeds.

- 6** 1. Because seeds can stick on animals fur or being eaten by animals and come out with their stool.
2. Because they are light seeds.
3. Because their seeds are spiny seeds

Model Exam on Concept (1.1)

- 1** (A) 1. d 2. b 3. c 4. b
(B) It will germinate and begins to grow well.

- 2** (A) 1. (✓) 2. (✓) 3. (x) 4. (✓)
(B) Because they are spiny seeds.

- 3** (A) 1. Water. 2. Flowers.
3. The Sun. 4. Potato plant
(B) 1. figure (A) – figure (B)
2. soil

- 4** (A) 1. c 2. d 3. b 4. a
(B) 1. leaves. 2. chemical.

Exercises on Lesson 1

- 1** 1. c 2. d 3. b 4. b
5. c 6. d 7. b 8. c
9. a 10. d 11. b 12. c
13. a 14. b 15. c

- 2** 1. e 2. c 3. d 4. a

1. (x) 2. (✓) 3. (✓) 4. (✓)
5. (x) 6. (✓) 7. (✓) 8. (x)
9. (✓) 10. (x) 11. (✓)

- 4 1. Ecosystem.
2. Photosynthesis.
3. Light energy. 4. The Sun.
5. Plants. 6. Glucose.
7. Carbon dioxide gas.
8. Oxygen gas. 9. Plants.

- 5 1. ecosystem 2. energy
3. plants (grasses)
4. water – carbon dioxide gas
5. food.
6. Sun
7. glucose sugar – oxygen gas

1. To get his needed energy and to do his activities.
2. Because it is absorbed by plants leaves, to make their own food and grow, then humans and animals eat these plants.

1. The plants cannot make their own food by photosynthesis process.
2. The hawk moves away to search for food in another ecosystem.

- 3 1. (A) and (B) – (C)
2. (B) 3. (A) and (C)
4. (B) and (C)

Exercises on Lesson 2

1. b 2. d 3. b 4. c
5. d 6. b 7. c 8. c
9. c 10. b 11. d 12. b
13. c 14. b 15. d 16. a

- 2 1. c 2. d 3. a

- 3 1. (✓) 2. (x) 3. (x) 4. (✓)
5. (x) 6. (✓) 7. (✓) 8. (x)
9. (✓) 10. (x) 11. (✓)

1. producers.
2. Decomposers.
3. Decomposition process.
4. Food chain.
5. prey. 6. predator.

- 5 1. producers
2. glucose – photosynthesis
3. consumers 4. plants
5. decomposers 6. primary
7. recycling

- 6 1. Because consumers cannot make their own food.
2. Because decomposers return nutrients of dead organisms back to the soil

1. The secondary consumers will move away to another ecosystem to search for food or they will die.
2. Dead organisms will not be decomposed, and their nutrients will not return back to the soil.

Exercises on Lesson 5

1. d 2. c 3. b 4. a
5. d 6. b 7. c

- 2 1. c 2. b

- 3 1. (✓) 2. (✓) 3. (x) 4. (x)
5. (✓) 6. (x) 7. (✓) 8. (✓)
9. (x)

1. Decomposition process
2. Scavengers.
3. Decomposers.
4. Recycling process.

1. food web.
2. scavengers – decomposers
3. producers.
4. decomposers – scavengers.
5. water. 6. fungi.
7. recycle

- Because scavengers feed on dead bodies by breaking them into small pieces.

- All dead bodies will not be decomposed, and its nutrients will not return back to the soil

- 8 1. (✓) 2. (✓) 3. (✓) 4. (✓)
5. (x) 6. (✓)

- 1 (1) Grasses (2) Duck
(3) Fox
a. tertiary b. decomposers
c. light chemical

- 9 1. a plant 2. bacteria
3. primary 4. eagle
5. bacteria

Exercises on Lesson 3

- 1 1. d 2. b 3. c 4. b
5. c 6. b 7. c

- 2 1. (✓) 2. (x) 3. (✓) 4. (x)
5. (✓) 6. (✓) 7. (✓)

1. producers
2. secondary consumer
3. primary consumer

- 4 1. d 2. c

Exercises on Lesson 4

1. d 2. c 3. b 4. c
5. d 6. a

- 2 1. (x) 2. (✓) 3. (x) 4. (x)
5. (✓)

1. food 2. food web
3. primary consumers

- 4 1. b 2. d 3. c 4. d
5. b

- 5 b

Exercises on Lesson 6

1. b 2. d 3. d 4. d
5. a

2. 1. (✓) 2. (✗) 3. (✓) 4. (✗)
5. (✗)

3. 1. Ecologist. 2. Plants.
3. Prairie

Model Exam on Concept (1.2)

1. (A) 1. b 2. a 3. d 4. c
(B) All dead organisms will not be decomposed and its nutrients will not return back to the soil.

2. (A) 1. (✗) 2. (✓) 3. (✗) 4. (✓)
(B) 1. Because desert ecosystem contains few members of producers.
2. Because scavengers feed on dead bodies by breaking them into small pieces.

3. (A) 1. Water
2. glucose – oxygen
3. primary
4. decomposers.
(B) d

4. (A) 1. the Sun.
2. Recycling process.
3. Prey. 4. Food chain.

- (B) 1. producers
2. secondary consumer.
3. primary consumers.

Concept (1.3)

Exercises on Lesson 1

1. c 2. b 3. a 4. b
5. c 6. d 7. b 8. a
9. b 10. c 11. b 12. d

2. 1. c 2. b

3. 1. (✓) 2. (✗) 3. (✗) 4. (✓)
5. (✗) 6. (✓) 7. (✓) 8. (✗)
9. (✗) 10. (✗) 11. (✓)

4. 1. Pollution. 2. Overfishing.
3. Top predators.

5. 1. pollution.
2. increases. 3. Overfishing
4. floods 5. top predators

6. 1. Because they will not find enough food to eat.
2. Because sharks feed on different fish that depend on algae to get their food.

7. 1. They will pollute water and the marine organisms will be negatively affected.
2. The water of the lake decreases due to its evaporation and may be completely disappears
3. The number of primary consumers increases and the amount of producers decreases.

8. 1. grasses – foxes
2. increases – decreases
3. rabbits 4. grasses

9. 1. algae 2. butterflyfish
3. hawks

Exercises on Lesson 2

1. c 2. d 3. d 4. b
5. a 6. c 7. d

2. 1. (✓) 2. (✗) 3. (✓) 4. (✗)
5. (✓) 6. (✓)

3. 1. Tertiary consumers.
2. Decomposers
3. Energy.

4. 1. prey 2. primary
3. decomposers 4. energy

5. 1. (✗) 2. (✗) 3. (✓) 4. (✓)
5. (✓)

Exercises on Lesson 3

1. b 2. c 3. d 4. a
5. d 6. c 7. b 8. a
9. c

2. 1. (✗) 2. (✓) 3. (✗) 4. (✓)
5. (✓) 6. (✓) 7. (✓) 8. (✓)

3. 1. Population.
2. Population change.
3. Seabirds.
4. Microorganisms.

4. 1. forests – oil 2. populations
3. smoke 4. increase
5. microorganisms

5. 1. Because pollution negatively affects all living organisms in food webs.
2. Because fire forests produce smoke that causes difficulty breathing of animals

6. 1. The population of this species will decrease.
2. The microorganisms will move away to a cooler water and also fish that feed on microorganisms.

7. 1. (✗) 2. (✓) 3. (✓) 4. (✗)
5. (✗)

Exercises on Lesson 4

1. c 2. d 3. b 4. a
5. c 6. b 7. d 8. c
9. b 10. b 11. c

2. 1. (✓) 2. (✗) 3. (✗) 4. (✗)
5. (✓) 6. (✗) 7. (✓) 8. (✗)
9. (✓) 10. (✓)

3. 1. Coral bleaching.
2. UV rays. 3. Microplastics.
4. Recycling.

4. 1. shelter 2. overfishing
3. extinction 4. predator
5. toxic

- 5 1. Because humans feed on fish that depend on algae in coral reefs for food.
2. Because when the water temperature rises the coral reefs get rid of algae from their tissues
3. Because rising of water temperature cause coral bleaching, and microplastics are toxic and sharp.

- 6 1. (x) 2. (x) 3. (✓)

Exercises on Lesson 5

- 1 1. c 2. a 3. d 4. a
5. d 6. d

- 2 1. d 2. c 3. b

- 3 1. (x) 2. (✓) 3. (✓) 4. (x)
5. (x)

b

Exercises on Lesson 6

- 1 1. d 2. b 3. c 4. a
5. d 6. b 7. a 8. d

- 2 1. (✓) 2. (x) 3. (✓) 4. (✓)
5. (x) 6. (✓)

- 3 1. Habitat restoration projects.
2. Nursery.
3. Habitat restoration.

- 4 bleaching – nursery – grow up – dying.

- 5 1. Because restoration projects take a lot of money and a long time.
2. Due to eroding of riverbanks.

- 6 1. (x) 2. (x) 3. (✓) 4. (x)

b

c

Final Exam on Concept (1.3)

- 1 (A) 1. b 2. d 3. c 4. d

(B) The number of primary consumers increases, and the amount of producers decreases.

- 2 (A) 1. (x) 2. (✓) 3. (✓)

(B) 1. Because fire forests produce smoke that causes difficulty breathing of animals.

2. Because, when the water temperature rises the coral reefs get rid of algae from their tissues.

- 3 (A) ecosystem – shelter – marine environment.

(B) Grasses > Deer > Lion

- 4 (A) 1. Nursery 2. Microplastics
3. Population

(B) 1. white 2. sunlight

Exercises on Lesson 1

- 1 1. b 2. a 3. d 4. a
5. c 6. d

- 2 1. c 2. d 3. b

- 3 1. (✓) 2. (x) 3. (x) 4. (✓)
5. (x) 6. (x)

- 4 1. Matter. 2. Temperature.
3. Solid.

- 5 1. solid – gas 2. solid
3. hot – cold 4. soft – hard
5. solid – gas

- 6 1. Wood (all items are liquids, while wood is solid).
2. Vinegar (all items are solids, while vinegar is liquid)
3. Coal (all items are gases, while coal is solid).

- 7 1. Because it has mass and volume.
2. Because rubber is a soft matter, while iron is a hard matter.

- 8 It becomes a gas.

- 9 1. d 2. c

10

Exercises on Lesson 2

- 1 1. a 2. c 3. b 4. b
5. b 6. a 7. d 8. d

- 2 1. b 2. c 3. a

- 3 1. (✓) 2. (x) 3. (x) 4. (x)
5. (x) 6. (x) 7. (✓) 8. (x)

- 4 1. Solid. 2. Liquid.
3. Gases. 4. Gases
5. Measuring tape.

- 5 1. solid – liquid 2. solid
3. liquid – gas 4. liquid.
5. length 6. solid

- 6 1. Because it has definite shape and volume.
2. Because it is a solid matter.
3. Because it is a gas matter.
4. Because it is a solid matter.

- 7 1. It will change according to the shape of each container.
2. It will not change.

- 8 1. (✓) 2. (✓) 3. (x) 4. (x)

Exercises on Lesson 3

- 1 1. d 2. b 3. c 4. a
5. c 6. d

- 2 1. (✓) 2. (✓) 3. (✓) 4. (x)
5. (✓) 6. (x) 7. (✓) 8. (✓)

1. Solid. 2. Particles.
3. Microscope. 4. Solid.
5. Liquid.

1. particles 2. solid
3. solid 4. solid – gas
5. liquid – shape

1. Because it is a gas.
2. Because they are not held together.

1. It will have a definite shape.
2. It will increase.
3. Particles cannot be seen.

1. (B)
2. (C) – (A) – (B) 3. (C)

Exercises on Lesson 4

1. d 2. b 3. a 4. b
5. a

1. (x) 2. (✓) 3. (x) 4. (x)
5. (✓) 6. (✓)

1. Gas.
2. Electron microscope.

1. increase. 2. high
3. particles 4. solid
5. regular

1. To study them in an easier way.

2. To see the components of one particle.

1. It will increase
2. It will increase.

1. solid 2. increase

Exercises on Lesson 5

1. b 2. a 3. c 4. a
5. b

1. (x) 2. (x) 3. (✓) 4. (✓)
5. (✓) 6. (✓)

1. Globe. 2. Model.

1. shape – volume.
2. solar 3. globe
4. microscope
5. volume – shape.

- Because their particles are arranged randomly.

- It will be organized (have a regular pattern).

1. (1) 2. (2) 3. (3) 4. (3)

Exercises on Lesson 6

1. a 2. d 3. b 4. a

1. (x) 2. (✓) 3. (✓) 4. (✓)

1. liquid. 2. space
3. solid – gas. 4. particles.
5. containers

- Because it has a definite volume and its shape is not definite.

- It becomes solid.

1. (x) 2. (✓) 3. (x) 4. (x)

Model Exam on Concept (2.1)

- (A) 1. solid 2. liquid.
3. particles 4. regular
(B) Because their particles are arranged randomly.

- (A) 1. a 2. a 3. b 4. a
(B) It will increase.

- (A) 1. (x) 2. (✓) 3. (x) 4. (x)
(B) 1. Wood (all items are liquids, while wood is solid).
2. Vinegar (all items are solids, while vinegar is liquid).

- (A) 1. Measuring tape.
2. Particle.
3. Microscope. 4. Gas.
(B) 1. c 2. a

Exercises on Lesson 1

1. b 2. d 3. d 4. a
5. b 6. d

1. c 2. a 3. d 4. b

1. (✓) 2. (✓) 3. (x) 4. (x)
5. (x) 6. (✓) 7. (x)

1. Ceramic tiles. 3. Volume.
2. Strong stones. 5. Length.
4. Mass.

1. Solid – liquid 2. mass
3. ceramic tiles – rains.
4. climate
5. balance – thermometer
6. length – mass.

1. To protect the desert home from dust and dirt.
2. To protect the tropical rainforest home from animals getting inside.

- The rain will be collected on the top of cold weather homes.

1. A 2. C 3. B 4. A

Exercises on Lesson 2

1. d 2. b 3. c 4. b
5. d 6. a 7. b 8. d
9. a 10. c

1. (x) 2. (✓) 3. (x) 4. (✓)
5. (x) 6. (✓) 7. (✓) 8. (✓)

1. Physical properties.
2. Chemical properties.
3. Volume. 4. Mass.
5. Temperature.

1. physical 2. odor
3. rough 4. chemical
5. mass 6. one thousand
7. temperature

- 1.** Because rusting of iron is a change that happens to iron when it interacts with air and water.
- 2.** Because quickly moving particles produce more heat energy which cause increasing in temperature.

- 6** 1. The paper becomes ash.
2. Its temperature will decrease.

- 7** 1. P 2. C 3. P 4. P
5. C 6. P 7. P

Exercises on Lesson 3

- 1** 1. b 2. d 3. c 4. a
5. b 6. a

- 2** 1. (✓) 2. (✗) 3. (✓) 4. (✓)
5. (✗) 6. (✓)

- 3** 1. doesn't attracted -- floats
2. sinks -- attracted
3. mass 4. iron -- cotton.

- 4** 1. The iron nail will attract to the magnet, while the plastic spoon will not attract to the magnet.
2. The piece of cork will float on the surface of water.

- 5** 1. B 2. A 3. A 4. B

Exercises on Lesson 4

- 1** 1. a 2. b 3. d 4. c
5. d 6. b 7. c 8. a
9. d

- 2** 1. e → B 2. d → D
3. b → E 4. a → C
5. c → A

- 3** 1. (✓) 2. (✗) 3. (✗) 4. (✗)
5. (✓) 6. (✓) 7. (✗) 8. (✓)

- 4** 1. Helium gas. 2. Conduction.
3. Rubber.

- 5** 1. chemical 2. helium -- air.
3. flammable -- poisonous
4. physical
5. heat -- electricity.
6. cooking pans -- wood.
7. steel -- hard -- strong.
8. rubber.
9. smooth -- transparent

- 6** 1. Because helium is a light gas which means it is lighter than air.
2. Because helium is not flammable or poisonous
3. Because wood and plastic are bad conductors of heat.

- 7** 1. The blimp will rise up in the air.
2. It will not conduct electricity.

- 8** 1. Copper. 2. Helium
3. Rubber 4. Steel.
5. Glass.

Exercises on Lesson 5

- 1** 1. b 2. a 3. d 4. c
5. b 6. c 7. b

- 2** 1. (✓) 2. (✓) 3. (✗) 4. (✓)
5. (✗) 6. (✗) 7. (✓)

- 3** 1. Measuring cup.
2. Paleontologists.
3. Cartographers.
4. Map.

- 4** 1. length 2. volume
3. speed 4. fossils
5. experiments. 6. satellites

- 5** 1. To measure correct lengths and widths of boards before building walls
2. To measure the volume and mass of ingredients before start baking.
3. To help tourists find their way.

- 6** 1. bakers.
2. space scientists.
3. builders.
4. cartographers.

Model Exam on Concept (2.2)

- 1** (A) 1. b 2. a 3. d 4. a
(B) Because helium is not flammable or poisonous.

- 2** (A) 1. chemical 2. temperature
3. climate 4. mas
(B) 1. Cartographers.
2. Physical properties.

- 3** (A) 1. (✗) 2. (✓) 3. (✗) 4. (✓)
(B) The iron nail will attract to the magnet, while the plastic spoon will not attract to the magnet.

- 4** (A) 1. c 2. a 3. d 4. b
(B) 1. Rubber.
2. Steel

Exercises on Lesson 1

- 1** 1. b 2. c 3. d 4. c
5. a 6. d 7. b 8. b
9. b 10. d

- 2** 1. d 2. c 3. a


- 3** 1. (✗) 2. (✓) 3. (✗) 4. (✓)
5. (✗) 6. (✓) 7. (✗) 8. (✓)
9. (✗)


- 4** 1. Melting process.
2. Solid state.
3. Liquid state.
4. Gas state.

- 5** 1. melts 2. increasing
3. melt. 4. solid -- liquid
5. solid -- volume -- shape
6. liquid
7. gas -- volume -- shape.
8. close together. 9. increase.

- 6** 1. Because the temperature of ice increases, so it will melt and becomes liquid.


2. Because it has definite volume but doesn't have definite shape.
3. Because air is considered as a gas state of matter.


-  1. The mass of tomatoes will not change.
2. They will melt and become liquid water.
 3. The particles of water will move faster.


-  1. 1 - it has definite volume and shape.
2. 3 - it has definite volume but doesn't have definite shape.
 3. 2 - it doesn't have definite shape and volume.
 4. 1 - 3


Exercises on Lesson 2


-  1. 1. b 2. d 3. c 4. b
5. a 6. c 7. b 8. d

-  2. 1. (x) 2. (✓) 3. (✓) 4. (x)
5. (✓) 6. (x) 7. (✓) 8. (x)

-  1. Physical changes.
2. Melting process.
 3. Freezing process.
 4. Liquid state.

-  4. 1. increase 2. temperature
3. decrease 4. melting
5. freezing 6. particles
7. water.

-  1. Because by increasing the temperature of ice, it will gain energy, so it changes to liquid water.
2. Because in these processes the matter changes without any change in its structure.


-  6. 1. The particles of water release energy and they move slower.
2. The piece of chocolate will melt.


-  7. 1. B - A - C 2. A - B - D


Exercises on Lesson 3


-  1. 1. c 2. a 3. b 4. c
5. d 6. c 7. d 8. a
9. b


-  2. 1. c 2. a 3. e 4. d

-  3. 1. (x) 2. (✓) 3. (✓) 4. (x)
5. (x) 6. (x) 7. (✓) 8. (x)
9. (x)


-  4. 1. Evaporation process.
2. Condensation process.
 3. Mixture.
 4. Compound.

-  5. 1. gas 2. solid
3. melting - evaporation
4. thermal
5. solid - liquid 6. compound.
7. filtration 8. evaporation


-  6. 1. Because thermal energy of the water vapor transferred to the cold surface, so the particles of water move slower and get close together causing water vapor changing into water.
2. Because they are formed of two or more materials.
 3. Because the particles of water are smaller than that of soil.

-  1. They will move faster and spread more, that change water into water vapor
2. The water will evaporate leaving the salt in the container.


-  8. 1. (x) 2. (✓) 3. (x)


-  9. 1. solid 2. gas
3. liquid
4. solid and liquid


Exercises on Lesson 4


-  1. 1. b 2. c 3. a 4. c
5. b 6. d

-  2. 1. (x) 2. (✓) 3. (x) 4. (✓)
5. (x) 6. (x)


-  3. 1. compounds 2. the same
3. color
4. mixture - mass - properties
5. changed.

-  4. Because mixing baking soda with vinegar produce gas causing bubbles which means that a compound is formed.


-  The mass and properties of sugar don't change.


-  1. 5 gm 2. 10 gm
3. changed into new color.
4. c

Exercises on Lesson 5

-  1. a 2. d 3. b 4. b
5. a 6. d 7. b 8. c
9. a

-  2. 1. (x) 2. (✓) 3. (x) 4. (x)
5. (✓) 6. (x) 7. (x) 8. (x)
9. (✓)

-  1. filtration
2. physical - chemical.
 3. new.
 4. oxygen - chemical
 5. physical - chemical

-  1. Because the components of mixture are physically combined together that means they don't react together.
2. Because it consists of a mixture of some gases.
 3. Because making fruit salad don't form new substance.
 4. Because the taste of the bread is not like its ingredients which means that a new substance is formed.

- 2** 1. The water will evaporate leaving the salt in the container.
2. The piece of metal will lose it's shining.

- 6** Because mixing vinegar with baking soda produces gas bubbles which cause inflating of the balloon

Exercises on Lesson 6

- 1** 1. c 2. b 3. d 4. a
5. d 6. b 7. c 8. b
9. d

- 2** 1. b 2. d 3. a 4. c

- 3** 1. (✓) 2. (✗) 3. (✗) 4. (✓)
5. (✗) 6. (✓) 7. (✓)

- 4** 1. chemical 2. physical
3. substance – properties.
4. chemical
5. chemical – physical
6. chemical – physical

- 5** 1. Because when iron reacts with oxygen and water it rusts (form a chemical substance called iron oxide).
2. Due to the chemical change that happens to the milk causing it produce a strong bad odor.

- 6** 1. A new substance is formed and its color is dark blue.
2. They release heat that can start a fire.

- 7** 1. Chemical change.
2. oxygen – water – rusting

- 8** 1. The ice cube will melt and changes into water.
2. Physical change, because it is the change of the state of water without any change in its structure.

Exercises on Lesson 7

- 1** 1. d 2. b 3. d 4. b
5. a 6. b

- 2** 1. (✗) 2. (✓) 3. (✗) 4. (✗)
5. (✓) 6. (✗) 7. (✗)

- 3** 1. Desalination process.
2. Filtration process.
3. Evaporation process.

- 4** 1. fresh – oceans – seas.
2. filtration
3. energy – expensive
4. salt – marne

- 5** Because it is a mixture of water, salt, other minerals, gases, living organisms and dead organisms.

- 10** Water vapor rises up leaving salts and other minerals.

- 2** 1. 1 2. 4 3. 2 4. 3

Model Exam on Con

- 1** (A) 1. temperature.
2. compounds
3. new 4. chemical
(B) Because air is considered as a gas state of matter

- 2** (A) 1. a 2. d 3. b 4. a
(B) The mass and properties of sugar don't change.

- 3** (A) 1. (✓) 2. (✗) 3. (✗) 4. (✓)
(B) 1. Compound.
2. Desalination process.

- 4** (A) 1. b 2. d 3. a 4. c
(B) 1. The ice cube will melt and changes into water.
2. Physical change, because it is the change of the state of water without any change in its structure

Guide Answers of Self-Assessments



Example (1-3)

Self-Assessment 1

- 1 (A) 1. a 2. c 3. d
 (B) Because plants make their food in their leaves during photosynthesis process.

- 2 (A) 1. (✓) 2. (✗) 3. (✗)
 (B) The plant can't make photosynthesis process, so it will die.

- 3 1. leaves.
 2. xylem roots.
 3. carbon dioxide.
 4. nutrients – oxygen.

Self-Assessment 2

- 1 (A) 1. (✗) 2. (✗) 3. (✓)
 (B) Because it carries water and nutrients from the roots to the leaves.

- 2 (A) 1. Hydroponic 2. Roots.
 3. Carbon dioxide gas
 (B) The seeds will germinate and make sprouts and begin to grow.

- 3 1. b 2. d 3. a

Self-Assessment 3

- 1 (A) 1. a 2. c 3. d

- (B) Because light is important to plant growth as plants use light to make their own food.

- 2 (A) 1. (✗) 2. (✗) 3. (✓)
 (B) The plant can't make its own food and will die.

- 3 1. green – yellow. 2. stomata.
 3. oxygen gas. 4. xylem.

Self-Assessment 4

- 1 (A) 1. Chlorophyll. 2. root hairs.
 3. oxygen.
 (B) The color of leaves will be turned into the same color of the water in the cup.

- 2 (A) 1. roots. 2. stomata.
 3. stem.
 (B) To transport the food materials downward, from the leaves to the other parts of the plant.

- 3 1. e 2. c 3. a 4. d

Self-Assessment 5

- 1 (A) 1. a 2. b 3. c
 (B) Because some plants only grow in the water while some plants grow on other plants instead of having roots in the soil.

- 1 (A) 1. (✓) 2. (✓) 3. (✗)
 (B) The plants can't absorb more water from the soil.

- 2 1. veins – nutrients
 2. sugar – phloem.
 3. xylem.
 4. arteries – sugar – oxygen

Self-Assessment 6

- 1 (A) 1. (✗) 2. (✗) 3. (✓)
 (B) Because they increase the amount of absorbed water from the soil.

- 2 (A) 1. Phloem. 2. Stomata.
 3. Reproduction.
 (B) Plant's leaves will be pale green or yellow.

- 3 1. wind – light seeds.
 2. water.

Model Exam on Concept 1.1

- 1 (A) 1. water – nutrients – roots.
 2. stomata
 3. wood – upright
 4. xylem – phloem.
 (B) Because it transports water and nutrient from the roots to the leaves.

- 2 (A) 1. b 2. d 3. a 4. c
 (B) The plant can't produce seeds for reproduction

- 3 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✓)
 (B) 1. Chlorophyll.
 2. Glucose sugar

- 4 (A) 1. b 2. c 3. c 4. d
 (B) 1. the heart 2. roots.

Concept (1.2)

Self-Assessment 7 on Lesson 1

- 1 (A) 1. (✗) 2. (✗) 3. (✗)
 (B) Because it produces the own food of producers which all consumers are feed on.

- 2 (A) 1. light 2. producers
 3. glucose
 (B) Consumers will not find food, and they will move away to another ecosystem to search for food.

- 3 1. b 2. d 3. a

Self-Assessment 8 till Lesson 2

- 1 (A) 1. b 2. d 3. c
 (B) Because producers use the light energy of the Sun to make their own food through photosynthesis process.

- 2 (A) 1. Nonliving things (All items are living organisms, except nonliving things).

2. Consumers (All items are related to photosynthesis except consumers).

3. Snakes (All items are decomposer, while snakes are consumers).

- (B) 1. plant – it makes its own food.
 2. bird – It eats grasshopper which is a primary consumer

- Producers : They are living organisms, that can make their own food by photosynthesis process.

- Consumers : They are living organisms, that feed on producers.

- Decomposers : They are living organism, that feed on dead organisms.

Self-Assessment 9 till Lesson 3

- 1 (A) 1. b 2. d 3. c
 (B) Because the living organism that eats plants is considered as a primary consumer.

- 2 (A) 1. Sharks (all items live on land, while sharks live in water).
 2. Plants (all items are decomposer, while plants are producers).
 3. Bacteria (all items are primary consumers, while bacteria are decomposers).

- (B) Grasses → Deer → Lion
 (or) Grasses → Deer → Crocodile

1. d 2. c 3. b 4. d

Self-Assessment 10 till Lesson 4

- 1 (A) 1. Fox (all items are primary consumers, while fox is a secondary consumer).
 2. Rabbit (all items are predators, while rabbit is a primary consumer).
 3. Eagle (all items are primary consumers, while eagle is a predator).
 (B) Because desert ecosystem contains a very small amount of producers.

- 2 (A) grasses – sunlight – insects – frogs
 (B) The top predator will move away from this ecosystem to search for food.

Figure (B)

Self-Assessment 11 till Lesson 5

- 1 (A) 1. b 2. d 3. b
 (B) All dead organisms will not be decomposed in this ecosystem.

- 2 (A) 1. Crabs (all items are decomposers, while crabs are scavengers).
 2. Bacteria (all items are primary consumers, while bacteria are decomposers).

3. House flies (all items are producers, while house flies are scavengers).

(B) Because this nutrients must be absorbed by producers at first, to make its own food to grow up.

3 1. c 2. a 3. d

Self-Assessment 12 till Lesson 6

1 (A) 1. (✓) 2. (✗) 3. (✗)
(B) Because they can fly in air.

2 (A) 1. a 2. b 3. c

(B) All living organisms in this ecosystem are moving away to another healthy ecosystem or they may extinct.

3 (3) Supply healthy water.
(1) Prevent pollution.
(2) Remove waste products.

Model Exam on Concept (1.1) & (1.2)

1 (A) 1. d 2. c 3. b 4. b

(B) The secondary consumers will move away to another ecosystem, or they may extinct.

2 (A) 1. (✗) 2. (✓) 3. (✗) 4. (✓)
(B) c

3 (A) (1) Grasses. (2) Duck
(3) Fox
a. tertiary

b. Decomposers
c. light – chemical – photosynthesis

(B) 1. leaves. 2. upright

4 (A) 1. Carbon dioxide gas.
2. Root hairs.
3. Decomposition process.
4. Flowers.

(B) 1. d 2. c

Concept (1.3)

Self-Assessment 13 on Lesson 1

1 (A) 1. Sea stars (all items are producers, while sea stars are primary consumers).
2. Algae (all items are primary consumers, while algae are producers).
3. Snakes (all items are top predators, while snakes are secondary consumers).

(B) Because any food chain begins with plants (producers) that depend on sunlight to make its own food.

2 (A) 1. c 2. d 3. d
(B) 1. producers 2. clam
3. secondary consumer
4. shark

3 Grasses → Deer → Lion

Self-Assessment 14 till Lesson 2

1 (A) 1. Decomposers (all items are types of consumers, while the other are decomposers).
2. Clam (all items live on land, while clam lives in water).
3. The Moon (all items form a food chain, while the Moon don't share in any food chain).

(B) Because predators feed on other consumers, which previously fed on plants or animals.

2 (A) 1. primary consumers.
2. producers 3. sunlight
(B) The amount of producers will be finished quickly, and most of primary consumers move away for another ecosystem to search for food.

3 1. (✗) 2. (✓) 3. (✗) 4. (✓)

Self-Assessment 15 till Lesson 3

1 (A) 1. (✗) 2. (✓) 3. (✗)
(B) Because algae will move toward an area where the water is cooler, and so small fish on which seabirds feed on will also move.

2 (A) 1. microorganisms.
2. primary consumers
3. small fishes
(B) The number of microorganisms on which small fish feed on will increase.



Micro-organisms → Small fish → Sea-bird

Self-Assessment 16 till Lesson 3

1 (A) 1. Coral bleaching
2. plastic 3. microplastics
(B) They will get rid of algae that live in their tissues, then turn completely into white and die.

2 (A) 1. White 2. real food
3. toxic and sharp
(B) Because plastic products are toxic and sharp, that harm coral reefs and other marine organisms.

3 I agree, because coral reefs ingest microplastics that produced when UV rays break down plastic waste materials into small parts.

Self-Assessment 17 till Lesson 3

1 (A) 1. a 2. d 3. b
(B) It will move away looking for other healthy coral reefs

- 2 (A) 1. (✓) 2. (✗) 3. (✗)
(B) Because UV rays break down plastic products into microplastics that ingested by coral reefs.

3 Algae > Coral reefs > Parrotfish > Sharks

Self-Assessment 18 till Lesson 6

- 1 (A) 1. (✗) 2. (✓) 3. (✗)
(B) The number of this animals species decreases gradually and may extinct.

- 2 (A) 1. d 2. c 3. a
(B) Because it decreases the amount of producers which consumers feed on, and also cause flooding and riverbanks eroding.

- 3 1. Zero plastics 2. plastic 3. nursery

Model Exam on Theme (1)

- 4 (A) 1. d 2. c 3. b 4. a
(B) Because green plants absorb sunlight during photosynthesis to make its own food and produce oxygen gas that all other living organisms need for breathing.

- 1 (A) 1. Producers. 2. Chlorophyll. 3. Scavengers. 4. Decomposers.
(B) Coral reefs will get rid of algae that live in their tissues, and turned completely into white and finally die.

- 2 (A) 1. consumers 2. wind light seeds. 3. preys 4. top predators.

(B)



- 4 (A) 1. grasses – foxes. 2. increases – decreases. 3. rabbits 4. grasses
(B) 1. (✗) 2. (✗) 3. (✓) 4. (✓)

Self-Assessment 19

- 1 (A) 1. solid 2. freezes. 3. gas
(B) It becomes a gas.
- 2 (A) 1. (✗) 2. (✓) 3. (✗)
(B) Because it has mass and volume.



Solids	Liquids	Gases
Sugar	Milk	Carbon dioxide
Stone	Blood	Oxygen
Coal	Oil	Water vapor

Self-Assessment 20

- 1 (A) 1. Glass (all items are gases, while glass is solid). 2. Air (all items are solids, while air is gas). 3. Coin (all items are liquids, while coin is solid).
(B) Because its volume is definite, while its shape is not definite.

- 2 (A) 1. gas 2. mass 3. soft
(B) It will decrease.

- 3 1. (A) → (B) > (C)
2. (C) → (B) > (A)

Self-Assessment 21

- 1 (A) 1. particles. 2. microscope. 3. solids.
(B) To help us see the structure of very small objects.

- 2 (A) 1. liquid 2. gas 3. definite
(B) It will increase.

- 3 1. (✓) 2. (✗) 3. (✓) 4. (✗)

Self-Assessment 22

- 1 (A) 1. solid 2. an electron 3. measuring tape.
(B) It will not have a definite shape.

- 2 (A) 1. (✗) 2. (✗) 3. (✓)
(B) Because it is a solid matter.

- 3 1 → d → 2
2 > c > 3
3 → a → 4

Self-Assessment 23

- 1 (A) 1. (✓) 2. (✗) 3. (✗)
(B) Because it has mass and volume.

- 2 (A) 1. solids 2. energy. 3. similar to
(B) We cannot know its structure.



Regular pattern	Random arrangement
Wood Plastic	Water Oxygen Oil Carbon dioxide

Self-Assessment 24

- 1 (A) 1. (✓) 2. (✗) 3. (✓)
(B) Because it is a gas.

- 2 (A) 1. volume. 2. solids
3. solids
(B) It will increase.

- 3 1. solid 2. liquid
3. gas 4. liquid – gas

Model Exam on Concept (2.1)

- 1 (A) 1. particles. 2. solar
3. solid 4. liquid
(B) Because it has mass and volume.

- 2 (A) 1. c 2. b 3. c 4. a
(B) It will be organized.

- 3 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✗)
(B) Coal (all items are gases, while coal is solid).

- 4 (A) 1. Electron microscope.
2. Model. 3. Solid.
4. Gas.
(B) 1. b 2. c

Self-Assessment 25

- 1 (A) 1. slanted 2. climate
3. thermometer.
(B) Because roofs of cold weather homes are made of ceramic tiles and they are slanted.

- 2 (A) 1. (✗) 2. (✓) 3. (✓)
(B) 1. Balance
2. Measuring cup.

- 3 1. 2 – rains. 2. 1 – dust – dirt.
3. 3 – animals getting inside.

Self-Assessment 26

- 1 (A) 1. b 2. a 3. d
(B) Because the mass of one paper clip equals one gram and the one kilogram equals one thousand gram.

- 2 (A) 1. balance. 2. mass
3. physical
(B) It will rust.

- 3 1. mass 2. volume
3. gram – kilogram.
4. milliliters – liters – cubiccentimeters.

Self-Assessment 27

- 1 (A) 1. c 2. a 3. d
(B) Because mass of matter is changed by changing its size.

- 2 (A) 1. (✗) 2. (✓) 3. (✗)
(B) It doesn't attract to the magnet.

- 3 1. material (A).
2. material (B). 3. balance.

Self-Assessment 28

- 1 (A) 1. d 2. b 3. a
(B) Because glass is transparent and smooth

- 2 (A) 1. Rusting (all items are physical properties of matter, while rusting is a chemical property of matter).
2. Kilogram (all items are measuring units of volume, while kilogram is a measuring unit of mass).
3. Iron nail (all items are not attracted to the magnet, while iron nail is attracted to the magnet).
(B) The piece of cork will float on the surface of water.

- 3 1. B – hard – strong.
2. C – waterproof flexible.
3. A – transparent – smooth.

Self-Assessment 29

- 1 (A) 1. c 2. a 3. b
(B) To guide ships through dangerous water.

- 2 (A) 1. (✓) 2. (✗) 3. (✗)
(B) You feel hot, because copper is a good conductor of heat.

- 3 1. mass – kilogram. 2. bakers
3. length – meter. 4. architects

Model Exam on Concepts (2.1) & (2.2)

- 1 (A) 1. increases. 2. mass
3. microscope 4. rubber
(B) Because rusting of iron is a change which happens in iron when it interacts with water and air

- 2 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✓)
(B) It will have a definite shape.

- 3 (A) 1. b 2. d 3. e 4. a
(B) 1. Solids 2. balance.

- 4 (A) 1. c 2. b 3. b 4. c
(B) 1. B 2. A

Self-Assessment 30

- 1 (A) 1. mass 2. melting
3. cooled
(B) Because water is a liquid matter.

- 2 (A) 1. water. 2. volume
3. faster.

(B) They will melt and change into liquid water.

- 3 1. B 2. A 3. C
4. B

Self-Assessment 31

- 1 (A) 1. thermal – water.
2. ice – volume – shape.
3. volume – shape.
(B) Because when decreasing the temperature of chocolate, its particles lose energy and move slower, so chocolate changes into solid state.

- 2 (A) 1. Thermal energy.
2. Solid state.
3. Freezing point.
(B) Melted chocolate will be turned into solid chocolate.

- 3 1. Solid 2. Melting
3. Liquid 4. Freezing
5. physical

Self-Assessment 32

- 1 (A) 1. heating.
2. compounds
3. condensation
(B) Because when salty water is boiled, the water will evaporate leaving the salt in the container.

- 2 (A) 1. condensation
2. away from
3. mixture.

(B) The distance between particles of water vapor will decrease.

- 3 1. Ice. 2. Water
3. water vapor 4. Melting
5. Freezing 6. Evaporation
7. Condensation

Self-Assessment 33

- 1 (A) 1. shape 2. gas
3. mass – properties
(B) Because by cooling the thermal energy of liquid water is lost, so its particles get close together and changed into ice.

- 2 (A) 1. faster 2. solid
3. mixture
(B) It will change into liquid water.

- 3 1. 20 2. 30 3. 30
4. remain as it is.

Self-Assessment 34

- 1 (A) 1. (×) 2. (✓) 3. (✓)
(B) Because burning of paper is considered as a chemical change which forms new substances.

- 2 (A) 1. Chemical change.
2. Condensation.
3. Physical change.
(B) C

- 3 1. Evaporation process.
2. Condensation process.
3. Physical change.
4. Salt only.

Self-Assessment 35

- 1 (A) 1. c 2. b 3. d
(B) Because coloring a paper is a change in matter without any change in its structure.

- 2 (A) 1. gas 2. compound
3. chemical
(B) Iron wire will rust.

- 3 1. gas – liquid 2. solid – liquid
3. Physical change.

Self-Assessment 36

- 1 (A) 1. c 2. b 3. d
(B) Because it consists of water, salt, other minerals, gases, living organisms and dead organisms.

- 2 (A) 1. (×) 2. (✓) 3. (✓)
(B) The particle of ice will move faster.

- 3 1. b 2. a 3. a

Model Exam on Theme (2)

- 1 (A) 1. d 2. d 3. c 4. a
(B) To examine one tiny particle such as a blood cell.

- 2 (A) 1. rough 2. globe
3. solid 4. ceramic tiles
(B) It will melt and change into liquid chocolate.

- 3 (A) 1. Ice (all items are liquid state, while ice is a solid state).
2. Coloring a paper (all items are chemical changes, while coloring a paper is a physical change).
3. Mixing vinegar with baking soda (all items produce mixtures, while mixing vinegar with baking soda produces a compound).
4. Rusting of iron (all items are physical changes, while rusting of iron is a chemical change).
(B) 1. Liquid state.
2. Volume.

- 4 (A) 1. b 2. c 3. a
(B) 1. solid 2. increase

Part

3

Guide Answers of Final Examinations



PART 3

Model Examinations

Model Exam 1

- 1 (A) 1. c 2. c 3. b 4. c
(B) To protect the desert home from dust and dirt.
- 2 (A) 1. (✓) 2. (✗) 3. (✓) 4. (✗)
(B) It can't make photosynthesis process and it will die.
- 3 (A) 1. pollution.
2. consumers – decomposers
3. stomata
4. physical – chemical
(B) 1. Wood, (all items are liquids, while wood is solid).
2. Sunlight, (all items are parts of the plant, while sunlight is an energy).
- 4 (A) 1. leaves 2. water.
3. seeds
4. Photosynthesis.
(B) 1. c 2. d 3. b

Model Exam 2

- 1 (A) 1. melts
2. substance – properties.
3. steel – hard
4. balance – thermometer
(B) It will increase.
- 2 (A) 1. Population. 2. Prey.
3. Water.
4. Plant's roots.

(B) To get his needed energy and to do his activities.

- 3 (A) 1. c 2. a 3. e 4. d
(B) 1. white. 2. wood
- 4 (A) (1) Grasses (2) Duck
(3) Fox
a. tertiary
b. decomposers.
c. light – chemical
(B) 1. Oxygen gas, (all items are used in photosynthesis process, while oxygen gas is produced from photosynthesis process).
2. Oxygen, (all items are solids, while oxygen is a gas).

Model Exam 3

- 1 (A) 1. (✗) 2. (✓) 3. (✓) 4. (✗)
(B) The magnet attracts iron nail but it doesn't attract the plastic spoon.
- 2 (A) 1. shelter. 2. overfishing.
3. extinction. 4. predator
5. toxic
(B) 1. leaves 2. roots
- 3 (A) 1. Melting process.
2. The volume.
3. Globe.
4. Tertiary consumers.
(B) Because the temperature of ice increases so, it will melt and becomes liquid.

- 4 (A) 1. a 2. b 3. c 4. c
(B) b

Model Exam 4

- 1 (A) 1. Plant's reproduction.
2. Producers.
3. Seabirds. 4. Solid state.
(B) Because helium is lighter than air.

- 2 (A) 1. (✓) 2. (x) 3. (✓) 4. (✓)
(B) Water and nutrients will not move up from the root to the leaves.

- 3 (A) 1. A plant 2. bacteria
3. primary 4. eagle
5. bacteria
(B) 1. b 2. c 3. a 4. d

- 4 (A) 1. b 2. c 3. a 4. a
(B) 1. (x) 2. (✓) 3. (x) 4. (x)

Model Exam 5

- 1 (A) 1. b 2. b 3. b 4. c
(B) 1. (✓) 2. (✓) 3. (x) 4. (x)

- 2 (A) 1. ecosystem.
2. hot – cold
3. flammable – poisonous
4. stomata
(B) Because by increasing temperature, it will gain energy and changed into liquid water.

- 3 (A) 1. Physical changes.
2. Evaporation process.
3. Tape Measure.
4. Top predators.
(B) The plant can't absorb the energy of sunlight, so it can't make photosynthesis.

- 4 (A) 1. (x) 2. (✓) 3. (x) 4. (✓)
(B) 1. c 2. b

Model Exam 6

- 1 (A) 1. sugar – leaves
2. carbon dioxide gas – water
3. flooding
4. soft – hard
(B) To protect this home from animals getting inside.

- 2 (A) 1. c 2. a 3. c 4. c
(B) Vinegar (all items are solids, while vinegar is a liquid).

- 3 (A) 1. (✓) 2. (✓) 3. (x) 4. (✓)
(B) The microorganisms will move away to a cooler water and also fish that feed on it.

- 4 (A) 1. Particle. 2. Mass.
3. Condensation process.
4. Plant's leaves.
(B) 1. c 2. d 3. a

Model Exam 7

- 1 (A) 1. Overfishing.
2. Oxygen gas.
3. Photosynthesis process.
4. Temperature.
(B) The temperature of the matter will decrease.

- 2 (A) 1. (✓) 2. (✓) 3. (x) 4. (x)
(B) Because it absorbs the energy of sunlight that helps the plant to make photosynthesis.

- 3 (A) 1. a primary 2. solid – gas
3. helium – air.
4. compound.
(B) 1. Solid 2. Gas
3. Liquid
4. Solid and liquid.

- 4 (A) 1. d 2. c 3. d 4. b
(B) d

Model Exam 8

- 1 (A) 1. (✓) 2. (x) 3. (✓) 4. (✓)
(B) Because it is not flammable and not poisonous.

- 2 (A) 1. c 2. b 3. b 4. a
(B) The speed of particles will increase.

- 3 (A) 1. Conduction.
2. Compound.
3. Stomata.
4. Scavengers.
(B) Gold (all items are liquids, while gold is solid).

- 4 (A) 1. liquid. 2. space
3. solid – gas. 4. particles.
(B) 1. c 2. a

Model Exam 9

- 1 (A) 1. a 2. d 3. b 4. c
(B) The water of the lake decreases due to evaporation and may be completely disappear.

- 2 (A) 1. physical 2. odor
3. rough 4. chemical
(B) Because in these processes the matter changes without any change in its structure.

- 3 (A) 1. (x) 2. (✓) 3. (✓) 4. (✓)
(B) 1. solid 2. increase

- 4 (A) 1. Mass. 2. Liquid state.
3. Sugar 4. Predator.
(B) 1. P 2. C 3. P 4. P

Model Exam 10

1 (A) 1. (✓) 2. (✗) 3. (✗) 4. (✗)

(B) 1. plants
2. Carbon dioxide

2 (A) 1. Electron microscope.
2. Paleontologists.
3. Photosynthesis process.
4. Roots.

(B) Because it is a solid matter.

3 (A) 1. solid 2. high
3. length – mass.
4. iron – cotton.

(B) The size of the balloon will increase.

4 (A) 1. d 2. c 3. a 4. a
(B) 1. (1) 2. (2)

NOTES